MUNICIPAL GOVERNMENT SURVEY ADVISORY COMMITTEE

CITY AND COUNTY OF SAN FRANCISCO

REPORT ON A STUDY
OF THE
DEPARTMENT OF PUBLIC WORKS

Vol. II

January 9, 1952

Prepared by
Griffenhagen & Associates
Consultants in Public Administration and Finance

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CHAPTER VI

BUILDING MAINTENANCE

1. Introduction

Prior to 1900 the repair and maintenance of public buildings were handled by a number of city and county agencies. The charter of 1900 established the bureau of building repair under the board of public works for the purpose of centralizing this repair and maintenance work. The bureau now provides these services to all city and county agencies. To meet the requirements of a wide variety of assignments, the bureau employs craftsmen representing nearly all of the recognized building trades.

On August 15, 1951 there were 319 employes working in the bureau. The total annual payroll cost of the 319 positions was $1,473,313. The total appropriation for the bureau for the fiscal year 1951-1952 is $789,614 compared with actual budget expenditures of $703,450 in the fiscal year of 1950-1951. Budget appropriations in the bureau are made for operating purposes, and for the payment of salaries of craft personnel on regular assignments to public buildings, but do not include interdepartment work which is done on work order and charged to using city agencies. The amount of interdepartment work in the fiscal year 1950-1951 was $1,325,248 of which $791,789 was for the payment of wages and salaries.

2. General Functions of the Bureau of Building Repair

The specific functions of the various organization units of the bureau of building repair are discussed in subsequent sections of this chapter dealing with these units. However, the principal bureau functions may be briefly stated as follows:

a. Making estimates of repair and maintenance costs on public buildings.

b. Providing building repair and maintenance services to city and county agencies by undertaking jobs and projects that cost less than $2,000 involving carpenter, cement finishing, electrical, glazing, locksmith, painting, plumbing, sheet metal, and steamfitting services.

c. Operating the city hall and the hall of justice, and providing certain building operation services in many other city and county buildings.

d. Painting traffic lines and markings on pavements and curbs as directed by the bureau of traffic engineering and the police department.

It was probably intended to establish a completely centralized building repair service for the city and county, but much repair work is done by contract on projects costing more than $2,000 and some agencies employ their own building maintenance craftsmen. The functions of the bureau of building repair have not been adequately prescribed either by law or by administrative order. If a central building repair and maintenance organization is to work to best advantage, the functions of the organization and its relations with other agencies must be clearly defined. It is recommended, therefore, that the functions of the bureau of building repair, developed as a result of consultation with all city and county agencies, be defined by ordinance.

3. General Organization of the Bureau

a. Present Organization Structure: The bureau of building repair is headed by a superintendent of maintenance and repair of public buildings, a civil service employe, who is appointed by and immediately responsible to the assistant director of public works, maintenance and operation. As of August 15, 1951 there were 12 organization units within the bureau. The number of positions assigned to each unit and the annual payroll cost at that time are shown in the tabulation that follows:

Name of Unit	Title of Head	No. of Positions	Annual Payroll Cost
Bureau of building repair	Superintendent of maintenance and repairs of public buildings	2	$ 15,900
Carpenter shop	General foreman, carpenter	30[a]	150,541
Cement shop	General foreman, cement finisher	21[a]	106,193
Electric shop	General foreman, electrician	24[a]	136,259
Glass shop	Foreman, glazier	6[a]	28,183
Locksmith shop	Foreman, locksmith	10[a]	50,096
Paint shop	General foreman, painter	50[a]	251,239
Plumbers shop	General foreman, plumber	27[a]	151,294
Sheet metal shop	General foreman sheet metal worker	17[a]	85,912
Steamfitters shop	General foreman, steamfitter	16[a]	90,068
Janitorial unit	Supervisor of janitors	79	272,076
City hall operations unit	Chief operating engineer	22	81,552
Hall of justice operations unit	Chief operating engineer	15	54,000
Totals		319	$1,473,313

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a/ Interdepartmental.

In computing payroll cost in the above tabulation the number of employes in the craft shops as of August 15, 1951 was assumed to be a constant for the entire year, although in reality the number varies through the year in accordance with the amount of work available. The bureau is allowed to hire as many building craft personnel as are required. The annual payroll costs shown in subsequent tabulations for positions paid at a daily rate are based on a 253 work-day year.

The number of salaried positions in the janitorial unit, city hall unit, and the hall of justice unit are specified in the salary ordinance and variations are due only to vacancies. Budgetary allowances are provided in the salary ordinance for occasional temporary help.

b. Management Staff: The management staff of the bureau, as of August 15, 1951, and the annual cost of each position are shown in the following tabulation:

Position	No. of Positions	Monthly Rate of Pay	Annual Payroll Cost
Superintendent of maintenance and repair of public building	1	$675	$ 8,100
Assistant superintendent of maintenance and repair of public buildings	1	650	7,800
Totals	2		$15,900

The heads of the 12 craft and maintenance units report either to the superintendent or assistant superintendent.

In addition, a clerk-stenographer, on a part-time basis, is assigned from the bureau of accounts.

c. Extent of Centralized Building Repair Services: The organization of the bureau of building repair is dependent to a substantial degree on the extent and amount of building repair work to be performed by the bureau. While the bureau handles building repair matters for all city and county agencies, it does not, by any means, do all of the city's repair and maintenance work. The current salary ordinance provides a substantial number of craft positions for agencies other than the bureau as is shown in the following tabulation:

Agency	Craft	No.
Recreation and park department	General foreman carpenter	1
	Foreman carpenter	1
	Carpenter	7
	Cement finisher	1
	Painter	7
	Plasterer	1
	Plumber	2
	Sheet metal worker	1
	Electrician	1
	Total	22
Board of education	Foreman carpenter	2
	Carpenter	11
	Painter	6
	Plumber	3
	Steamfitter	2
	Electrician	2
	Total	26
Laguna Honda home	Carpenter	1
	Painter	1
	Electrician	1
	Total	3
Library	Carpenter	1
	Painter	1
	Electrician	1
	Total	3
San Francisco Hospital	Electrician	2

In addition, certain craftsmen are employed by the water department and the municipal railway department. The craft work in these two departments is generally of a highly specialized nature, and it is not at all certain that it should be performed by the bureau of building repair, although the bureau should confer with these agencies to determine the extent to which general repair work should be done by the bureau.

It is evident from the above tabulation that a substantial amount of routine building repair work is being handled by other city agencies than the bureau of building repair. This work, except for the carpentry work in two of the agencies, is usually performed without the benefit of technical craft supervision. The lack of technical supervision is a serious weakness

inherent in building repair decentralization and inescapable because the work volume of these individual agencies is too small to permit the employment of a supervisor for each craft. It is reported, also, that the equipment facilities of these agencies may not be adequate to meet efficiently even the routine repair jobs undertaken.

The bureau of building repair makes permanent craft assignments to certain public buildings when the volume of craft work warrants it. Such assignments are made to the San Francisco Hospital and the Laguna Honda Home, yet both of these institutions also employ their own craftsmen, as is shown in the above tabulation.

The primary reasons for centralizing building repair activities in one city agency are to provide competent technical supervision, effective utilization of a staff that necessarily includes a variety of specialized skills, and a full line of equipment so that the work can be performed efficiently and economically. However, city agencies are not taking full advantage of the centralized service and at the present time the bureau cannot know, even approximately, the needs of some agencies, since the bureau is called on to perform only work that cannot be handled by agency forces. The city and county should establish a clear policy as to what, if any, building repair activities are to be handled independently by each city agency, with the clear determination that such activities shall be kept to a minimum. This will enable the bureau of building repair to organize effectively to handle a planned and fairly constant workload.

d. Effectiveness of Top-Level Supervision of Building Repair Practices: The superintendent of the bureau devotes a large proportion of his time to maintaining a detailed control of all material requests and purchases in the bureau. The superintendent reports that this work is so time consuming that he has not been in the field for many months to review his bureau's operations, which, by their very nature, require extensive and careful supervision. It is strongly recommended that the superintendent be freed of this detailed work. A proposal for maintaining adequate control of requisitions is presented later in this chapter.

To compensate for his inability to provide field supervision, the superintendent requires that each foreman in charge of a craft unit report directly to him at 8:00 a.m. and 1:00 p.m. on each working day to receive work order assignments for the unit and to report on tasks being performed. As a result, some of the foremen believe that they report directly to the superintendent, while others indicate that they report to the assistant superintendent. It is believed that a better planned organization will correct this weakness.

There are too many units in the organization to make it desirable that one person be directly responsible for all units. The span of control for one person should be small enough to permit effective control and supervision. The organization of the bureau can be divided logically into a repair division, handling all repair work performed by the various crafts, and two public building maintenance divisions to be discussed elsewhere in this chapter.

A repair division in the bureau would contain the nine craft units. Although it is not generally advisable that more than six or seven units report to one person, the nature of the work of these craft units would permit adequate top supervision by one person of all nine crafts, since the supervisor can review the work of several crafts at one job location.

The supervision of the repair division would require a high degree of technical and administrative ability because of the nature of the work of the craft units. The importance of the work justifies placing the assistant superintendent in direct responsibility over this division.

It is recommended that the craft units of the bureau be grouped to form a repair division and that the assistant superintendent head this division.

e. Clerical Services: Because it performs a large volume of interdepartmental work, the bureau of building repair has considerably more clerical work than the other three operating bureaus of the department. To do this clerical work the bureau has assigned to it, from the bureau of accounts, one general clerk-stenographer for seven hours a day. The clerk is required to relieve the regular switchboard operator one hour a day for lunch. This leaves the bureau without any clerical help between 1:00 p.m. and 2:00 p.m. daily. During that time the superintendent or his assistant remains in the office to receive telephone calls.

The volume of clerical work in the bureau requires the services of at least one full-time clerk to relieve the superintendent of many of the routine clerical tasks he is performing. The clerk should be under the functional control of the bureau of accounts but under the administrative control of the bureau of building maintenance. His first responsibility should be the clerical work of the bureau of building maintenance and any remaining time should be devoted to processing bureau work for the accounting unit.

It is, therefore, recommended that the clerk of the bureau of building repair be relieved of the duties of part-time switchboard operator and be assigned to the bureau of building repair on a full-time basis, with the primary responsibility of doing the building maintenance clerical work.

f. Proposed Top Organization of the Bureau: To implement the recommendations on top organization of the bureau, it is proposed that the bureau adopt the plan of organization shown in the following tabulation (lines of descending authority indicated by indentation of unit names):

Unit	Head of Unit
Bureau of building maintenance	Superintendent of building maintenance
Repair division[a]	Assistant superintendent of building maintenance
City hall operations division[b]	City hall operating engineer
Hall of justice operations division	Hall of justice operating engineer

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a/ Includes the nine building crafts units.

b/ To include the watchman positions now in the bureau of street repair as recommended elsewhere in this report.

Under the proposed organization all of the building crafts would be merged in the repair division of the bureau and be under the assistant superintendent. The city hall operations would include all custodial services for the city hall and the public works yard, limited services for buildings located in the civic center, and janitorial service for the police stations. The hall of justice operations would include all of the custodial services at the hall of justice.

g. The Carpenter Unit: Finished and rough carpentry and cabinet making are performed by the carpenter unit which is headed by a general foreman carpenter. The number of positions and the annual payroll cost are shown in the following tabulation:

	No. of Positions	Daily Rate of Pay	Annual Payroll Cost
General foreman carpenter	1	$22.60	$ 5,718
Foreman carpenter	1	21.60	5,465
Carpenter	11	19.60	54,549
Foreman carpenter	1	21.60	5,465
Carpenter	11	19.60	54,549
Carpenter	5[a]	19.60	24,795
Totals	30		$150,541

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a/ The five carpenters are permanently assigned to specific agencies: San Francisco Hospital - 2; city hall - 1; hall of justice - 1; fire department - 1.

h. The Cement Unit: Cement work, plastering, and tile setting are performed by the cement unit. The head of the unit is the general foreman cement finisher. The number of positions in the unit and the annual payroll costs are shown in the following tabulation:

	No. of Positions	Daily Rate of Pay	Annual Payroll Cost
General foreman cement finisher	1	$22.36	$ 5,657
Cement finisher	6	19.36	29,388
Cement finisher's helper	10	18.52	46,860
Plasterer	3	24.00	18,216
Tile setter	1	24.00	6,072
Totals	21		$106,193

When a cement finisher's helper is working with a cement finisher, the latter has authority and responsibility for the job.

i. The Electric Unit: The electric unit handles electrical repairs, including the repair of electric motors. The head of the unit is the general foreman electrician. The number of positions in the unit and the annual payroll cost are shown in the following tabulation:

	No. of Positions	Daily Rate of Pay	Annual Payroll Cost
General foreman electrician	1	$27.60	$ 6,983
Foreman electrician	1	24.80	6,274
Armature winder	1	17.60	4,453
Electrician	9	22.00	50,094
Foreman electrician	1	24.80	6,274
Armature winder	1	17.60	4,453
Electrician	8	22.00	44,528
Electrician	2[a]	22.00	13,200
Totals	24		$136,259

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a/ One assigned to the city hall, the other to the hall of justice.

j. The Glass Unit: Broken glass in public buildings is replaced by the glass unit which is headed by a foreman glazier. The number of positions in the unit and the annual payroll cost are shown in the following tabulation:

m. Plumbing Unit: General plumbing repair work is handled by the plumbing unit headed by a general foreman plumber. The number of positions in the unit and the payroll cost are shown in the following tabulation:

Position	No. of Positions	Daily Rate of Pay	Annual Payroll Cost
General foreman plumber	1	$26.00	$ 6,578
Plumber	26[a]	22.00	144,716
Totals	27		$151,294

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[a] Eight of these plumbers are permanently assigned to the following agencies in the number indicated: San Francisco Hospital - 2; Laguna Handa home - 2; fire department - 1; city hall - 1; county jail - 1; hall of justice - 1.

n. Sheet Metal Unit: Sheet metal work is performed by the sheet metal unit headed by a general foreman sheet metal worker. The number of positions in the unit and the annual payroll cost are shown in the following tabulation:

Position	No. of Positions	Daily Rate of Pay	Annual Payroll Cost
General foreman sheet metal worker	1	$22.80	$ 5,768
Sheet metal worker	16	19.80	80,144
Totals	17		$85,912

o. Steamfitter Unit: Steam heating apparatus and steam pipes are installed and repaired by the steam fitting unit which is headed by a general foreman steamfitter. The number of positions in the unit and the annual payroll cost are shown in the following tabulation:

Position	No. of Positions	Daily Rate of Pay	Annual Payroll Cost
General foreman steamfitter	1	$26.00	$ 6,578
Steamfitter	15[a]	22.00	83,490
Totals	16		$90,068

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[a] One steamfitter is assigned to each of the following buildings: San Francisco Hospital, city hall, Laguna Honda Home, and the hall of justice.

p. Janitorial Unit: The cleaning of public buildings, including window cleaning, is handled by the janitorial unit. The unit is headed by a supervisor of janitors. The number of positions in the unit and the annual payroll cost are shown in the following tabulation:

Position	No. of Positions	Monthly Rate of Pay	Annual Payroll Cost
Supervisor of janitors	1	$462	$ 5,544
Foreman janitor	1	363	4,356
Foreman janitor	1a/	358	4,296
Janitor	18	286	61,776
Janitor	4	270	12,960
Janitor	4	242	11,616
Janitress	1	275	3,300
Working foreman janitor	1b/	314	3,768
Janitor	2	281	6,744
Janitor	3	270	9,720
Sub-foreman window cleaner	1c/	363	4,356
Window cleaner	5	330	19,800
Working foreman janitor	1d/	330	3,960
Janitor	4	286	13,728
Janitor	1	280	3,360
Janitor	1	242	2,904
Foreman janitor	1e/	363	4,356
Janitor	7	286	24,024
Janitor	3	281	10,116
Janitor	1	270	3,240
Janitress (part-time)	1	80	960
Window cleaner	1	330	3,960
Janitor	9f/	286	30,888
Janitor	2f/	280	6,720
Janitor	1f/	270	3,240
Janitor	2f/	269	6,576
Janitor	2f/	242	5,808
Totals	79		$272,076

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a/ Crew assigned to city hall day shift.

b/ Crew assigned to city hall night shift.

c/ Four of crew assigned to city hall, one to health center building.

d/ Crew assigned to health center building.

e/ Crew assigned to hall of justice.

f/ These 16 janitors are assigned as follows: police department - 6; city hall afternoon shift and retirement board building - 7; public works yard - 1; central emergency hospital - 1; city planning commission building - 1.

The janitors and window cleaners working in the city hall and the hall of justice are responsible to a supervisor of janitors. The chief operating engineers of the buildings have no control over these employes. This creates a divided responsibility for building operations that is not conducive to good administration. It is general practice elsewhere to have the chief operating engineer or some other employe act as the chief custodian of a building so that one person may be held responsible for the satisfactory operation of that building.

It is recommended that the janitorial unit in the city hall, the public works yard, the civic center buildings, and the police stations be placed under the supervision of the chief operating engineer of the city hall, that the janitorial unit working in the hall of justice be placed under the supervision of the chief operating engineer of the hall of justice, and that both supervisory positions be directly responsible to the superintendent of the bureau.

q. City Hall Operating Unit: The city hall operating unit operates the civic center powerhouse which furnishes heat to the city hall, health center, emergency hospital, and the civic auditorium, and provides city hall elevator and watchman service. The unit is headed by a chief operating engineer. The number of positions in the unit and the annual payroll cost are shown in the following tabulation:

Position	No. of Positions	Monthly Rate of Pay	Annual Payroll Cost
Chief operating engineer	1	$528	$ 6,336
Operating engineer	1	380	4,560
Operating engineer	1	360	4,320
Operating engineer	1	340	4,080
Operating engineer	1[a]	320	3,840
Junior operating engineer	5[b]	340	20,400
Elevator operator	8[c]	240	23,040
Watchman	4[d]	312	14,976
Totals	22		$81,552

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a/ This engineer serves as a relief man at Marina pumping station.

b/ One junior engineer works part time at hall of justice.

c/ One elevator operator assigned full time to civic auditorium.

d/ One watchman assigned full time to bureau of street repair.

One watchman is currently assigned to full time duties for the bureau of street repair. On two days a week he works as a relief watchman at the asphalt plant and three days a week he works as a watchman on bridge operations. The salary of this watchman is paid by the bureau of street repair by an inter-

department fund transfer. In view of the fact that the position is permanently assigned to the bureau of street repair it should be shown on the budget of that bureau, thus eliminating the necessity for periodic bookkeeping transactions. It is, therefore, recommended that one position of watchman be transferred from the bureau of building repair to the bureau of street repair. This position of watchman should not be confused with the two positions of watchman which are recommended to be transferred from the bureau of street repair to the bureau of building repair elsewhere in this report.

r. Hall of Justice Operations Unit: The hall of justice operations unit provides heating and elevator service for the hall of justice and heating service for the county jail. The unit is headed by a chief operating engineer. The number of positions in the unit and the annual payroll cost are shown in the following tabulation:

Position	Number of Positions	Monthly Rate of Pay	Annual Payroll Cost
Chief operating engineer	1	$528	$ 3,168 a/
Operating engineer	3	380	13,680
Operating engineer	2	320	7,680
Junior operating engineer	1	340	4,080
Elevator operator	3	280	10,080
Elevator operator	4	264	12,672
Elevator operator	1	220	2,640
Totals	15		$54,000

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a/ One half of chief operating engineer's salary charged to the bridge operations unit in the bureau of street repair as employe spend afternoons supervising bridge operations.

4. Operating Policies and Procedures

a. General Comments: It is pointed out in another section of this report that a primary objective of centralizing building repair functions in one bureau is to provide competent supervision in the field and in the office. Yet supervision of the bureau is weak in many respects, partly due to its present organization and partly due to inadequate procedures.

The technical methods of operation as observed during field studies are good. The office control of field activities is excellent. This section of the report deals with those aspects of operating policies and procedures which can be improved to provide more effective and economical management.

b. Supervision of Bureau Operations: The most serious weakness in the bureau's operations is a lack of supervision at all levels. This is due in part to organization weaknesses which have been previously discussed. Equally important however, is the old craft concept that, as employes are accomplished

craftsmen, working on a variety of tasks, there is not a need for close supervision of the craftsman's activities and such supervision is difficult to provide. It has been demonstrated frequently that this concept is mistaken. The city and county operations are less effective than they would be if provision were made for continuing supervision. It is recommended that supervision in the bureau be strengthened and that the superintendent and his assistant initiate a program of foreman training in administrative and supervisory practices.

c. Craft Personnel on Permanent Assignments: In those public buildings where it is considered necessary because of the volume of work, certain craft personnel are assigned on a permanent basis. Twenty-one such assignments are now in effect, involving an annual salary expenditure of $114,705. Although retaining functional control of these employes, the craft foremen rarely make periodic inspections of the work they perform. Furthermore, supervision is exercised only very casually and sporadically by the building custodians.

The need for continuing supervision of the personnel on such regular assignments is just as great as for any other personnel in the bureau. It is, therefore, recommended that craft foremen be required to exercise more positive supervision over bureau personnel permanently assigned to public buildings, by making frequent inspections of work performed by such personnel.

d. Management Reports and Records: The job records maintained by the superintendent are similar to those kept by the general foremen and by the bureau of accounts, although the last mentioned are based on actual costs rather than estimates. The necessity for maintaining three sets of similar records is doubted. The bureau of accounts should, of course, keep detailed cost records of the operations. The general foremen should keep man hour records for all jobs, in order to check the progress of the jobs, to make unit analyses of the work, and to provide a basis for estimating future work. The value of the superintendent's records is doubtful. Control over unit operations can be exercised effectively by adequate field supervision and improved accounting management reports as discussed elsewhere in this report.

Improved field supervision can be realized through systematic and periodic spot checks on material requisitions, and by making a detailed check of some jobs after their completion, to see that the amount and kind of material indicated on requisitions was actually used. Such periodic spot checks would be considerably more effective than the present office control, because they would enable the superintendent to see the job itself, check the materials, review the work for quality and completeness, and enable him to judge the work of the foremen at the same time. This type of field check should form a part of the superintendent's review of operations previously discussed in this chapter.

It is recommended that the superintendent of the bureau discontinue making detailed reviews of every requisition for materials and that this responsibility be delegated to the general foremen of operating units. It is further recommended that the superintendent make periodic spot checks of jobs, by going to the jobs, checking the amount of materials used against the

requisitions, and reviewing the work for quality of performance and completeness.

e. Janitorial Operations: Janitorial operations are carried on for a number of public buildings on staggered day, afternoon, and evening shifts, depending upon the building concerned. The supervisor of janitors and his immediate assistant work the day shift. The supervisor reports that he only infrequently inspects or supervises the work of janitors assigned to public buildings other than the city hall. Actually, both the supervisor and his immediate assistant spend the greater part of their time in the city hall keeping attendance time rolls and dispensing supplies. It is difficult to understand how these tasks would occupy more than a fraction of the time of one man. A substantial part of the time of either a supervisor or a foreman, responsible for the overall direction of 79 people working a number of different shifts in a number of different locations, should not be spent on such work.

Janitors working the day shift or night shift in the city hall are supervised by a foreman in direct charge of the shift. Yet the afternoon shift of janitors in the city hall and retirement board building is under no direct supervision.

It is necessary that the supervisory policy and procedures of the janitorial work be strengthened if the work is to be performed efficiently and economically. It is recommended, therefore, that:

(1) The supervisor of janitors accept responsibility for supervising all the employes assigned to the buildings under his jurisdiction;

(2) The assistant to the supervisor of janitors be assigned responsibility for supervising the afternoon and night shifts by arranging his working hours so that he will be at his post during the afternoon and evening; and

(3) A position of working foreman janitor be established in lieu of one of the janitorial positions on the afternoon shift at the city hall to provide a working supervisor for the afternoon crew.

f. Responsibility for Building Operations: The bureau provides janitorial, watchman, elevator, window washing, and heating service, to several buildings in the civic center, the hall of justice, the police stations, and the public works yard. The extent of service rendered in each building is shown in the following tabulation:

Building	Janitor	Window Washing	Watchman	Elevator	Heat
City hall	X	X	X	X	X
Health center	X	X			X
Central emergency hospital	X				X
Civic auditorium (Bd. of Education)				X	X
Planning commission	X				
Retirement board	X				
Hall of justice	X	X		X	X
Police stations	X				
Public works yard	X	X	X		X

There seems to be no standard policy for providing operational services to the various buildings shown in the above tabulation. The necessity for providing these services for the city hall and the hall of justice is clear, because the bureau is charged with the responsibility for maintaining the two buildings. However, the practice of providing only certain services for buildings in the civic center should be examined. There appears to be little reason for providing janitorial and window washing services for the health center and not providing elevator service. On the other hand, the bureau provides elevator service to the board of education for the civic auditorium but does not provide janitorial service. The responsibility for building operations should be clearly defined in a city and county policy. It is therefore recommended that the city and county adopt a consistent policy defining the responsibility of the bureau of building repair for the building operations of all public buildings.

g. Unit Measurement for Estimating Job Costs: Estimates of costs for work by the craft units in the bureau are generally made by the foreman at the head of each craft, with the exception of the carpenter and electric units, where subordinate foremen make the estimates. The foreman examines the location of the required work and makes an estimate, in terms of the number of man-day units and the amount of materials and supplies he thinks will be necessary to complete the job. The formal estimate developed therefrom refers to the location of the work and the total costs of labor, materials, and supplies. This casual method of making and reporting estimates, upon which subsequent work orders are issued, makes it difficult for bureau management to determine the validity of the estimate and, therefore, the quality of craft performance on the job, and the proper cost of the work.

It is essential that, in the direction and control of the work of the bureau of building repair, a system of work measurement be devised which will serve as a basis for making estimates and which will permit management to make comprehensive analyses of bureau operations. Although certain phases of the work of building maintenance do not lend themselves easily to establishing work units of measurement, most of the work of the bureau can be measured with sufficient accuracy to provide management with a sound basis for analysis. Work units could be developed for painting, plastering, glass work, cement work, window cleaning, floor mopping, and, to some extent, for other work in the bureau. Area units for cement work, plastering, painting, and other work are used extensively in estimating costs of work by private contractors and by city departments doing force account work. Such work units should be developed by the bureau and used as the basis for keeping performance records and making summaries of the various operations. It is therefore recommended that job estimates be prepared on the basis of unit work measurements, and that these measurements be used in maintaining records of performance and in reporting the operations of the bureau.

h. Review of Estimates: The office of the controller has established a rather elaborate procedure in dealing with those interdepartmental work orders which exceed estimated cost by which the bureau is required to prepare detailed justification for the authorization of additional funds. It is reasonable, therefore to expect that the foreman, making an estimate on which the work order will be based, will allow an adequate

margin in his estimate so that the actual cost will not exceed the estimated cost of the job. The result is a tendency to use up the entire amount of funds available, more particularly as craft employes are paid on a daily basis and most of them can be laid off at any time if work is not available. It is imperative, therefore, that job estimates be made on a systematic basis, as has been previously discussed, and that the estimates be reviewed periodically by bureau management for accuracy and completeness. Such a review is not now made and a basic phase of the bureau's activities is thus left unsupervised and uncontrolled. It is strongly recommended that the assistant superintendent and the superintendent make periodic reviews of job estimates to insure their adequacy, accuracy, completeness, and uniformity.

The general foremen at the head of the carpenter and electric units delegate the responsibility for making estimates to subordinate foremen. There is no objection to this delegation. However, the general foremen of these units should make periodic reviews of the estimates by actually going out in the field with the foremen, or after the foremen have made the estimates, and checking the accuracy of the estimate. No such reviews are now being made in the carpenter or electric units. It is, therefore, recommended that in the craft units, where the general foremen have delegated the responsibility for making estimates to subordinate foremen, the general foremen make periodic reviews of estimates.

i. Clerical Work for Craft Units: A considerable amount of clerical work is necessary in the operation of each craft unit. Bureau regulations allow a specified number of hours daily for craft personnel to do this work. The title of the positions regularly assigned to part-time clerical work and the number of hours allowed for each unit are shown in the following tabulation:

Unit	Title of Position Assigned to Clerical Work	No. of Hours Daily
Carpenter shop	Foreman	4
Cement shop	Cement finisher	2
Electric shop	Foreman	4
Glass shop	None	none
Locksmith shop	None	none
Paint shop	Painter	4
Plumbers shop	Plumber	4
Sheet metal shop	Sheet metal worker	2
Steamfitters shop	Steamfitter	2

The practice of using craft personnel to do clerical work is acceptable because (1) the clerical duties require only part time and personnel can be used on craft work the remainder of the time, and (2) the clerical work requires a considerable knowledge of craft practices and procedures.

It was observed that, although regular assignments for clerical work are made in most of the units, the unit foremen were also required to do some clerical work. In two units, the glass shop and the locksmith shop,

no clerical help is assigned and the unit foremen are required to do all this work. To require a unit craft foreman to do clerical work is not desirable since he should be in the field making estimates and supervising unit personnel.

To make definite time assignments for clerical work encourages abuses in the productive use of time. The general foreman should make assignments, indicating the maximum time to be spent on clerical work, with the understanding that whenever such work is completed, the man immediately return to his regular craft assignments. The unit foremen should make periodic spot checks to determine whether the amount of clerical work being performed fully justifies the time spent on it.

It is recommended that the practice of using supervisory employes to perform clerical work be discontinued and that craft personnel be assigned for the work. It is further recommended that unit foremen make clerical assignments on a maximum time basis and that they make periodic spot checks to justify the time spent on the amount of clerical work performed. The management should also make a study to determine the desirability of establishing a central clerical service for all units, so that crafts personnel may be freed for actual repair work.

j. Job Bidding by Bureau Shops: The charter permits city agencies to bid on work costing more than $2000 in competition with other bidders. Bureaus of the department of public works are required by departmental order to seek permission from the director of public works before submitting bids on such work. It is reported that the bureau of building repair has made only a limited number of such bids in the past. The bureau has submitted bids on sheet metal work, primarily for the construction of disposal cans used by the street cleaning department, approximately once every two years. No other unit in the bureau reports bidding on jobs costing more than $2000.

There is a definite gain from requiring the bureau to make periodic bids against outside contractors. Such bids serve as a check to see that contractors' prices are reasonable and in line with the prices generally quoted. They also provide a check on bureau operations and show whether the costs of the bureau are in line with those of private contractors. Often cities require their own agencies to submit bids for jobs, not with the idea of doing the work, but merely to see that the bids of the contractors and the operating costs of city agencies are not excessively high. This is a good control device and should be used more extensively by the city. Such bidding can also be used to advantage to maintain a stable complement of personnel by undertaking an occasional large project when the volume of smaller work is low. It is, therefore, recommended that the bureau of building repair be required to submit bids periodically on jobs costing more than $2000, and that the director of public works continue to specify on which jobs bids should be made. Inflation increases the importance of such bidding since the bureau cannot undertake as large projects as it was able to perform in the past. The extent to which the bureau actually works on jobs costing more than $2000 should depend on a carefully planned program. The amount of such work to

be undertaken has a definite bearing on total expenditures, personnel, and equipment requirements of the bureau, and should be controlled to provide a work program that will preclude excessive fluctuations in operating requirements.

If the volume of work of the bureau grows, a coordinator or administrative assistant may have to be assigned to the bureau on a full-time basis to develop a work program for the bureau and to guide its administration, but at the outset, the planning and control of projects should be performed by the management analysis unit of the office of the director of public works. A discussion regarding such coordination and control for the entire department is contained elsewhere in this report.

k. Performance Records for Employes on Regular Craft Assignments: The practice of assigning craftsmen on a permanent basis to certain public buildings with a continued and substantial volume of craft work is sound. However, management should know positively and show conclusively that such assignments are warranted. One of the usual means of determining whether such assignments are justified is by the analysis of performance records of the employes on such regular assignments.

At present each such employe reports a day's work as having been spent on his permanent assignment but does not maintain a daily record of his activities. Only one such employe keeps records, and it was noted that he kept work requests on a spindle and periodically entered the completed jobs in a journal. Even in this instance, however, there was no indication that either the requests on the spindle or the journal were ever reviewed. No report of activities is maintained by most of these permanently assigned craft employes and in no case is a daily report of activities turned in to the supervisor. The management can have only a vague idea of the amount and quality of the work performed by employes on regular assignments.

Each employe can readily maintain a daily record of the work performed and the amount of time spent on each repair job. Other bureaus in the department keep such records with no apparent difficulty. The fact that the work of these employes is all repair work and much of it is miscellaneous does not lessen the necessity or desirability of maintaining such daily reports.

The value of accurate and complete daily reports, however, is proportional to the use which will be made of them. Such reports would serve as an excellent supervisory tool for reviewing the work of the employes and certainly should be used for that purpose. The reports would also enable bureau management to make a continuing analysis of the necessity for retaining the individual craft employe on permanent assignment.

It is recommended that craft personnel on regular assignments to public buildings be required to make a daily report of all activities, showing the kind of work done, the location, and the time spent on each activity. It is further recommended that the daily reports be reviewed by the supervisor for accuracy and completeness, and that they be used as a basis for analysis of performance and as a guide to supervision.

1. Maintenance Records for Public Buildings: During the field studies it was found that the public buildings under the maintenance care of the bureau of building repair were generally in a clean condition. The floors in the city hall and the hall of justice buildings are swept daily and some public hallways are swept more often. The windows in these buildings were generally clean.

The fact that the buildings appeared in a good condition does not necessarily indicate that the work is being done as efficiently and economically as possible. There are no schedules of the frequency of sweeping, dusting, mopping, waxing, or any of the other janitorial activities for the various sections of the buildings. Such schedules are desirable to permit an objective analysis of the work in relation to the time being spent, and would also help in the training and orientation of new employes.

A similar schedule for window washing should be made for the city hall and the hall of justice. In addition, records should be kept of window washing operations. These records should be analyzed to determine whether window washing can best be handled by city forces or not Many cities contract window washing in public buildings when it is demonstrated that this method is less expensive than any alternative arrangement.

It is recommended that schedules for the janitorial activities in public buildings be developed and followed. It is, further, recommended that records of window cleaning operations be maintained and that they be periodically analyzed to determine whether this activity may be performed on contract at a reduced cost.

5. Equipment

a. Present Equipment: On August 15, 1951, the bureau had a total of 36 vehicles. The kind, make, number, and the year of acquisition of each vehicle are shown in the following tabulation:

Passenger Cars	Year of Acquisition
1 - Coupe, Oldsmobile	1936
1 - Coupe, Chevrolet	1940
2 - Sedan, Chevrolet	1940
1 - Coupe, Ford	1941
1 - Coupe, Chevrolet	1947
1 - Coupe, Mercury	1947
1 - Coupe, Chevrolet	1949
1 - Coupe, Ford	1949
1 - Coupe, Ford	1950
1 - Coupe, Ford	1951
Dump Trucks	
1 - Dump, $1\frac{1}{2}$ ton	1948
1 - Dump, $1\frac{1}{2}$ ton	1951

Express Trucks	Year of Acquisition
1 - Express truck, 1½ ton, with rear motor	1937
1 - Express truck, 1½ ton, with rear motor	1938
1 - Express truck, 1½ ton, with rear motor	1940
2 - Express truck, 1½ ton	1948
1 - Express truck, 1½ ton, with rear motor	1949
1 - Express truck, 1½ ton	1951
1 - Express truck, 1½ ton, with rear motor	1951
Panel Trucks	
7 - Panel truck, 1 ton	1947
1 - Panel truck, ½ ton	1948
1 - Panel truck, Suburban	1950
1 - Panel truck, ½ ton	1951
1 - Panel truck 1 ton	1951
Pickup Trucks	
1 - Pickup truck, ½ ton	1947
2 - Pickup truck, ½ ton	1948
1 - Pickup truck, ½ ton	1951

In addition, the bureau had six hired trucks, of which two were ½ ton pickups, two were 3/4 ton pickups, one was a one ton panel, and one was a two ton flat truck.

The amount and kind of equipment appears to be generally adequate for the bureau's needs although some of the vehicles are approaching the point where it would be economical to replace them. The operating costs of older vehicles should be watched closely so that when they reach the stage of excessive unit costs of operation they can be replaced. The development of adequate automotive data for the department as a whole has been discussed elsewhere in this report.

6. Expenditures for Building Repair

a. Current Expenditures: The expenditures of the bureau of building repair for the fiscal years 1949-1950 and 1950-1951 and the budget for 1951-1952 are shown in the following tabulation:

	Expenditures		Budget
	1949-1950	1950-1951	1951-1952
Permanent salaries	$ 361,707	$ 356,111	$ 442,149
Allowance for overtime	238	250	250
Allowance for holidays	2,197	1,998	2,359
Leaves and replacements	2,723	1,725	-
Temporary salaries	3,608	3,976	5,938
Wages	149,196	177,673	163,745
Wages-supervisory	19,653	-	21,500
Contractual services	14,228	10,444	14,050
Heat, light, and power	1,971	2,072	4,100
Truck hire	1,022	722	1,000
Improvements, repairs, and maintenance of public buildings	92,821	76,348	75,000
Maintenance and repairs - procurements and statutes	400	9	200
Materials and supplies	23,524	22,336	22,050
Fuel oil	31,823	32,360	29,000
Equipment	7,001	14,331	4,800
Services of other departments	3,055	3,023	3,473
	$ 715,167	$ 703,450	$ 789,614
Interdepartmental - wages and salaries	775,877	791,789	a/
Interdepartmental - other	548,810	533,459	a/
Totals	$2,039,854	$1,928,698	a/

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a/ Not available from the budget

The failure to provide adequate supervision at all levels has not promoted efficiency or economy in the bureau's operations. It is admittedly difficult to estimate the savings that would result to the city and county if proper supervision were provided. Yet it can be said with certain that with such supervision, efficiency of operations would increase substantially and the saving in time and effort would amount to at least $40,000 annually.

b. Unit Cost Records: The cost records of the bureau of building repair are maintained by the bureau of accounts and show detailed costs on each job and total expenditures for the bureau. There are no records to show the detailed unit cost of operation for the individual units of the bureau. Such information is desirable to provide a cost appraisal of each activity. A cost analysis should show conclusively whether an activity is being performed economically, or whether it might be less expensive for the city and county to carry on the activity by contract and thereby eliminate an entire operating unit. Some cities find it substantially cheaper to contract, on an annual basis, for certain kinds of work, than to do the work by force account. It is not suggested that the city necessarily contract its building repair work, but the city should take steps to learn whether its work is being done more economically by maintaining permanent staffs and

shops than it would be under an alternative method. If unit costs indicate the desirability of accepting an alternative method, then the city and county should discontinue the operation of any unit not economically sound.

It is recommended that unit costs of operation be developed for building repair activities; it is further recommended that, if the unit costs for any activity are substantially higher than the cost of performing activity by outside contract, consideration should be given to contracting the work and eliminating the unit presently doing the work.

CHAPTER VII

STREET CLEANING

1. Introduction

The bureau of street cleaning is the largest unit of the department of public works. It has 338 employes and spends more than $1,350,000 a year. It was created as a bureau in July 1950 by separating the division of street cleaning from the bureau of streets of which it has been a part since 1934.

In the early days of street cleaning in the city, the activity was under an elected superintendent of public streets, highways, and squares, and after 1879 the cleaning work was done by contract. The contract arrangement continued under the department of public works which was created in 1900. It was not until after the fire and earthquake that a street cleaning department was created in the department of public works, and separate entity was maintained until 1934.

The bureau does all of the street cleaning work in the city on accepted streets (paved to city standards) except that one flusher is operated by the North Central Improvement Association in the financial district. It also cleans state highways within the city. The streets of the city are kept unusually clean in comparison with those of most metropolitan communities, and the pavements in the industrial areas and the poorer sections of the city are cleaned just as carefully as in other sections. The work of the bureau is severely hampered by an excessive amount of littering and by completely unrestricted parking, and both of these practices make the work more difficult and more expensive than it otherwise would be.

2. Functions and Activities

The bureau of street cleaning cleans the 795 miles of streets of the City and County of San Francisco that have been paved and accepted. As a part of this work the bureau cleans and services five underpasses and the Stockton tunnel; cleans 48 curb-miles of center strips and islands, 35 in-

stallations of pedestrian steps, all vacant city-owned lots and tracts, and public monuments; and cleans up after public celebrations, parades, and accidents. Specifically, the bureau is responsible for conducting the following activities:

a. Hand sweeping streets in business areas by 132 blockmen, each of whom is assigned from four to 100 blocks to keep clean.

b. Hand sweeping residential streets by 10 gangs that also engage in cleaning pedestrian underpasses and street stairs, cutting weeds in gutters and along curbs, and loading and hauling the collected sweepings.

c. Flushing main business and traffic streets on nine flusher routes daily, flushing around center strips and islands, and washing tunnel walls and monuments.

d. Machine sweeping those streets that are reasonably free from parked vehicles on 10 motor sweeping routes daily.

e. Collecting blockmen sweepings and the litter from corner baskets with six "can" trucks, and hauling the refuse to the dumps.

f. Patrolling specified routes and picking up street litter utilizing nine "paper-litter" trucks, picking papers from vacant city-owned lots, sweeping "paper pockets," collecting refuse from the produce area, and hauling the wastes to the dump.

g. Collecting motor sweeper dirt, answering complaints, and doing emergency street cleaning using four utility trucks.

h. Cleaning main business and traffic streets on Saturdays and Sundays using blockmen, flushers, motor sweepers, and pick-up trucks.

i. Maintaining and operating three dumping areas in conjunction with the bureau of streets.

j. Maintaining Ingleside Park on Junipero Serra Boulevard.

k. Supervising equipment repairs, washing and cleaning vehicles and machines, changing brooms on motor sweepers, making gutter brooms for motor sweepers, and maintaining cans, baskets, tool boxes, and can sheds.

l. Participating in the civil defense procedure by clearing streets and doing other assigned tasks.

m. Developing routes, establishing methods, practices, and procedures for street cleaning operations.

3. Organization and Staff

a. Organization Structure: The bureau is headed by a superintendent of street cleaning who is a civil service employe appointed by the director of public works and is responsible directly to the assistant director of public works for maintenance and operation. The plan of organization of the bureau for weekday street cleaning work is shown in the following tabulation:

Name of Unit	Title of Head of Unit	No. of Positions	Annual Payroll Cost
Bureau of street cleaning	Supt. of street cleaning	1	$ 7,800
Central district	District director	48	172,626
Northern district	District director	91	330,705
Southwest district	District director	92	342,978
Southeast district	District director	80	301,485
Night crew	Subforeman	3	13,543
Special day force and relief force		23	86,462
Totals		338	$1,255,599

Regular street cleaning operations, five days a week from Monday to Friday inclusive, are administered by the four districts shown above except for a small night crew and a small day force which are directly under the superintendent of street cleaning. The names of the districts shown above are not used by the bureau, but are given for identification purposes. It is believed that these or some other names or numbers should be given to the operating units. The dumps are supervised by the directors of the districts in which the dumps are located.

The Saturday, Sunday, and celebration and parade cleaning work is performed by the regular forces on an overtime basis as follows:

Overtime Work	Supervisor	No. of Employes	Annual Payroll Cost
Saturday morning regular	District director	34[a]	$18,928
Saturday afternoon regular	District director	22[a]	12,339
Sunday morning regular	District directors	44[a]	31,447
New Year's cleanup	District directors	160[a]	4,327
Parade cleanup - av. 3 a yr.	District directors	49[a]	1,698
Total overtime work			$68,739

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[a] Regular employes on special assignments - not additional employes.

The total annual cost of personal services at the present salary and wage rates is estimated to be $1,324,300.

The regular Saturday and Sunday cleaning work is supervised by one district director for an entire week end. The district directors are assigned in rotation to take charge of these overtime operations. Special organizational arrangements are adopted for the cleanup after parades and other public celebrations, and normally all four district directors are assigned to supervise the various kinds of work.

In addition to his regular duties of supervising street cleaning operations in the main business and industrial areas of the city, the district director of the central district is responsible for assigning employes for overtime and special duties; for assigning employes to fill in for those who are sick, on vacation, or absent for other causes; and for maintaining records of assignments. His supervisory load is somewhat lighter than that of the other district directors because of these office duties.

b. Comments on Street Cleaning Organization: The basic plan of the organization of street cleaning work is simple and direct and with minor exceptions serves excellently under present conditions. There is a single head for the unit, and the lines of authority and responsibility are clear and are well understood by the employes of the bureau. There does not appear to be any important duplication or overlapping of activities. Control is exercised almost entirely by personal field supervision of street cleaning work, but through good discipline and energetic surveillance many of the difficulties are overcome.

The few weaknesses that have been found in the organization plan seem to be due to the willingness of the superintendent to assume direct charge of special activities and personal responsibility for certain minor operations. It is believed, however, that the management of the work would be easier if the weaknesses were corrected.

The span of control of the superintendent is too wide for the best management of the work. The responsibility for the main activities of the bureau is well delegated to the four district directors, but six employes engaged in miscellaneous work and a clerk-stenographer on office work also report directly to the superintendent. In order to free the superintendent to handle the truly administrative matters of the bureau, including the necessary planning of future operations, it is believed that some of this miscellaneous load of minor operating duties should be reallocated.

Most of the street cleaning operations are properly organized on a geographical basis. One of the main advantages of using this for dividing the work is that it is possible to hold each district director wholly responsible for all activities in his area and for the cleanliness of the streets. If some operations in a district are conducted independently of the district director concerned, then he can no longer be held completely responsible for results. For example, the district director of the central district has no control over the night flushing and machine sweeper work done in that district. Similarly, the day flusher that is now operated from the field office may work in any of the four districts without coming under the supervision of the district director concerned. Likewise, the collection of motor sweeping dirt is under the superintendent and is separated from district control. The complaint work which is now partially handled on a

central basis may not be easy to transfer completely to the district crews. Most of the less urgent complaints are now answered by the regular forces of the districts, but a better system of communication would have to be developed to enable the district forces to deal promptly with emergency cleaning work.

The staff work and the facilitative service work of the bureau, however, should not be organized on a district basis, but should be provided from a central office. If internal subdivision is needed, it should be done on an activity basis. The development of plans, schedules, routes, and budgets, the analysis and summation of operating data, and the conduct of public education activities should properly be attached to the office of the superintendent of street cleaning. Similarly, such management of the equipment as is done by the bureau should also be directed from that office.

It is recommended that authority and responsibility for all operational activities be placed entirely in the respective districts under the district directors so that they can be held fully accountable for the cleanliness of streets and for all activities within their areas. Under this proposal, responsibility for all night cleaning, the present day flushing, and the present machine dirt pick-up work would be transferred to the district organizations.

It is recommended that a position of administrative assistant be provided in the office of the superintendent of street cleaning with responsibility for analyzing and summarizing operating data for the supervisory staff; assigning employes to overtime work and to relief duties as is now done by a district director; conducting such public education work as is found desirable; aiding in developing new schedules and routes; analyzing equipment needs and methods; and generally assisting the superintendent in the administration of the bureau. The position might be designated as assistant superintendent of street cleaning if it is necessary to do so in order to secure an employe qualified in this work.

c. The Staff of the Bureau: The regular staff of the bureau as of August 15, 1951, and the cost of personal services for street cleaning work are shown in the following tabulation:

Position	No. of Positions	Rate of Pay		Annual Payroll Cost
		Daily	Monthly	
Superintendent of street cleaning	1	$	$650.00	$ 7,800.00
District director (central district)	1		490.00	5,880.00
Chauffeur, flusher	1	19.36		4,917.44
Laborer, flusher	1	13.60		3,454.40
Chauffeur, can truck	1	19.36		4,917.44
Laborer, can truck	2	13.60		6,908.80
Chauffeur, paper truck (2, ½ time)	1	19.36		4,917.44
Laborer, paper truck (4, ½ time)	2	13.60		6,908.80
Laborer, blockman	39	13.60		134,721.60
Totals	48			$172,625.92
District director (northern district)	1		490.00	$ 5,880.00
Subforeman, gang sweeping	3	14.60		11,125.20
Laborer, sweeper	18	13.60		62,179.20
Chauffeur	3	19.36		14,752.32
Laborer	6	13.60		20,726.40
Chauffeur, paper truck	2	19.36		9,834.88
Laborer	4	13.60		13,817.60
Chauffeur, street can truck	2	19.36		9,834.88
Laborer	4	13.60		13,817,60
Chauffeur, flusher	2	19.36		9,834.88
Laborer	2	13.60		6,908.80
Laborer, blockman	44	13.60		151,993.60
Totals	91			$330,705.36
District director (southwest district)	1		490.00	$ 5,880.00
Subforeman, gang sweeping	4	14.60		14,833.60
Chauffeur	4	19.36		19,669.76
Laborer	8	13.60		27,635.20
Laborer	24	13.60		82,905.60
Chauffeur, paper truck	3	19.36		14,752.32
Laborer	6	13.60		20,726.40
Chauffeur, street can truck	1	19.36		4,917.44
Laborer	2	13.60		6,908.80
Chauffeur, flusher	1	19.36		4,917.44
Laborer	1	13.60		3,454.40
Chauffeur, motor sweeper	5	19.36		24,587.20
Chauffeur, sweeping pick-up	1	19.36		4,917.44
Laborer	2	13.60		6,908.80
Laborer, blockman	26	13.60		89,814.40
Laborer, dumpman	2	13.60		6,908.80
Gardener	1		270.00	3,240.00
Totals	92			$342,977.60

Position	No. of Positions	Rate of Pay		Annual Payroll Cost
		Daily	Monthly	
District director (southeast district)	1	$	$490.00	$ 5,880.00
Subforeman, gang sweeping	3	14.60		11,125.20
Chauffeur, gang sweeping	3	19.36		14,752.32
Laborer	6	13.60		20,726.40
Laborer, sweeper	18	13.60		62,179.20
Chauffeur, paper truck (4,2 half-time)	3	19.36		14,752.32
Laborer, paper truck (8,4 half-time)	6	13.60		20,726.40
Chauffeur, street can truck	2	19.36		9,834.88
Laborer, street can truck	4	13.60		13,817.60
Chauffeur, flusher	3	19.36		14,752.32
Laborer, flusher	3	13.60		10,363.20
Chauffeur, motor sweeper	4	19.36		19,669.76
Laborer, blockman	23	13.60		79,451.20
Laborer, dump man	1	13.60		3,454.40
Totals	80			$301,485.20
Subforeman, night	1	14.60		$ 3,708.40
Chauffeur, flusher	1	19.36		4,917.44
Chauffeur, motor sweeper	1	19.36		4,917.44
Totals	3			$ 13,543.28
Chauffeur, day flusher	1	19.36		$ 4,917.44
Laborer, day flusher	1	13.60		3,454.40
Chauffeur, sweeper pick-up truck	2	19.36		9,834.88
Laborer, sweeper pick-up truck	4	13.60		13,817.60
Subforeman, relief	1	14.60		3,708.40
Laborer, relief	12	13.60		41,452.80
General clerk-stenographer	1		285.00	3,420.00
Rental truck driver	1		488.00	5,856.00
Totals	23			$ 86,461.52
Totals regular weekday	338			$1,255,598.88

The staff for overtime and special services is shown in the following tabulation (none of the positions shown is additional to those of the regular service):

Saturday morning - regular 4 hrs.

District director	1	$ 750.88
Chauffeur, can truck	1	755.04
Laborers	2	1,060.80
Chauffeur, flusher	1	755.04
Laborer	1	530.40
Chauffeur, motor sweeper	1	755.04
Laborers, blockmen	27	14,320.80
Totals	34	$ 18,928.00

Position	No. of Positions	Rate of Pay Daily	Rate of Pay Monthly	Annual Payroll Cost
Saturday afternoon - regular 4 hrs.				
District director	1			$ 750.88
Chauffeur, can truck	1			755.04
Laborer, can truck	2			1,060.80
Chauffeur, flusher	1			755.04
Laborer, flusher	1			530.40
Laborer, blockman	16			8,486.40
Totals	22			$12,338.56
Sunday morning - regular 4 hrs.				
District director	1			$ 750.88
Chauffeur, can truck	3			2,265.12
Laborer, can truck	6			4,243.20
Chauffeur, flusher	1			755.04
Laborer, flusher	1			707.20
Chauffeur, motor sweeper	2			1,510.08
Laborer, blockman	30			21,216.00
Totals	44			$31,447.52
Special duty - parades and celebrations				
New Years				
District directors	4			$ 115.52
Foreman, gang sweeping	9			262.80
Chauffeur, gang sweeping	12			348.48
Laborer, gang sweeping	24			652.80
Laborer, gang sweeping	68			1,849.60
Chauffeur, flusher	7			203.28
Laborer, flusher	7			190.40
Chauffeur, box truck	2			58.08
Laborer, box truck	4			108.80
Chauffeur, machine sweeper	1			29.04
Chauffeur, extra	3			87.12
Laborer	6			163.20
Laborer, blockman, full-time	5			136.00
Laborer, blockman, half-time	7			95.20
Dump man	1			27.20
Totals	160			$4,327.52

Position	No. of Positions	Rate of Pay Daily	Rate of Pay Monthly	Annual Payroll Cost
Parades - (average, 3 a year)				
District director	3		$490.00	$ 43.32
Chauffeur, motor sweeper	3	$19.36		43.56
Chauffeur, flushers	3	19.36		43.56
Laborer, flushers	3	13.60		30.60
Subforeman, gang sweeping	2	14.60		21.90
Chauffeur, gang sweeping	6	19.36		87.12
Laborer, gang sweeping	12	13.60		122.40
Laborer, gang sweeping	16	13.60		163.20
Dump man	1	13.60		10.20
One parade	49			$ 565.86
Three parades (average annual total)				$ 1,697.58
Total personal services	647			$1,324,338.06

In the above tabulations, the rates of compensation shown are those now in existence under present agreements. On overtime work, the laborers receive time and a half for Saturday work and double time for Sunday and holiday work. Chauffeurs receive time and a half for all overtime work. The supervisory personnel is paid time and a half for overtime assignments up to a maximum regular rate of $400 a month which amounts to $3.61 an hour for the highest overtime service. Overtime work is divided as equally as practicable among the employes, but an employe is not eligible for an overtime week end assignment unless he has worked a full 40 hour week. This practice serves to promote regular attendance and should be continued.

The need for continuous street cleaning work is discussed in another section of this report, but in substance some of the operations are routine and continuous and they should be manned on the same basis as those of other essential continuing public services, such as water plant operation. The littering of streets does not stop Friday night or Saturday noon, and in many locations week end activities produce more street dirt than do those of regular weekdays. In such areas, street cleaning should be handled on a continuing basis rather than an overtime basis and certain employes should be assigned to staggered shifts so that they work Saturdays or Sundays or both, either on a regular or a rotating basis. The fact that night street cleaning work is on a premium rather than an overtime basis would tend to substantiate this proposal. It is recommended that efforts be made to have street cleaning work in certain areas recognized as a continuous activity and to get permission to schedule operations to include regular Saturday, Sunday, and holiday cleaning on a regular shift basis. This would permit a rearrangement of schedules to provide adequate week end and holiday cleaning at regular rates rather than at overtime rates.

The clerk-stenographer position shown in the tabulation of the street cleaning staff is actually on the payroll of the bureau of accounting. In actual practice, however, this employe filling the position works full time on street cleaning work in the office of the superintendent of street cleaning except for brief switchboard relief, and is under the supervision of the superintendent. The cost of the service is charged to the street cleaning appropriation. It is recommended that the position be transferred to the bureau of streets and the record-keeping activities of the position be under the functional supervisor of the proposed bureau of accounting and finance.

4. Street Cleaning Procedures

a. Major Street Cleaning Problems: The street cleaning work that is being done by the bureau is generally well conducted with certain minor exceptions that are discussed in this section of the report. The major street cleaning problems, however, arise not so much from present procedures and practices of the bureau, as from those conditions and circumstances that make the street cleaning work much heavier than is necessary. The excessive littering of streets by citizens is the principal cause of streets becoming dirty and unsightly soon after they are cleaned. The presence of parked vehicles on the streets 24 hours a day, every day, prevents adequate street cleaning and precludes the use of the more efficient methods.

It is desirable to examine the present street cleaning program in relation to the standard of cleanness of the streets and the cost of the work. These and related procedural matters will be considered in this section of the report.

b. Frequency of Street Cleaning: The number of times a week or a month that a street is cleaned depends on the standard of cleanliness demanded by the citizens and on the amount of dirt that reaches the street surfaces. Obviously, main business streets and main traffic arteries must be cleaned oftener than streets that are used by fewer people. Likewise, streets in lower class residential areas will normally have to be cleaned more frequently than those in better residential districts. The unusual wind conditions of the city must also be taken into account in considering cleaning frequency.

Judged by the present frequency of cleaning and by the willingness of the people to pay $1.75 per capita or $1,715 a mile each year for street cleaning, the citizens want clean streets. Generally, the city's streets are reasonably clean, but not as clean as would be expected in view of the amount of cleaning work that is done or by the rate of expenditures for this activity. From the standpoint of the street cleaning operating forces, one of the principal planning tasks is to decide on the frequency with which each street is to be cleaned in order to maintain suitable cleanliness on one hand and to avoid wasting public funds by overcleaning on the other hand. Under the conditions that now exist it is probable that the frequency of cleaning many streets is too low to be generally acceptable to the public. Without much question, however, the frequency of cleaning business streets and traffic arteries would be adequate if littering could be reduced.

Actually, the frequency of cleaning varies rather widely with the use of the streets and the character of the districts, but some average frequencies may be given. Market Street from Embarcadero to Castro is hand-swept twice a day and flushed twice a day, except on Sunday when it is flushed and swept only once. The streets around the civic center, and Maiden Lane are cleaned with the same frequency as Market Street. Main business streets and main traffic arteries are usually flushed and hand-swept once a day. Secondary business streets may be flushed three times a week. Outlying main traffic streets are normally cleaned once or twice a week either by hand-sweeping or machine-sweeping. Residential streets are cleaned from once a week to once in two weeks.

The use of litter and paper truck crews to patrol certain areas to collect street dirt that tends to accumulate in certain pockets is a device of the bureau to reduce the frequency of cleaning. The officials believe that the method is effective. Some aspects of this activity are discussed in a subsequent section of this chapter.

The frequency of cleaning residential and outlying streets is considerably less from May to September, inclusive, than in other months because of the absence of cleaning personnel on vacations. If the reduced frequency is acceptable to citizens then, it may be contended that more frequent cleaning at other times is unnecessary. On the other hand, the regular frequency may be proper, and the curtailed summer program a lapse from the desirable standard. Vacations of the cleaning employes should be spread over the entire year to equalize the load and to improve the cleaning work in the summer months.

It is believed that a thorough study of street cleaning frequency should be made by the office of the superintendent for the purpose of eliminating unnecessary cleaning or discovering streets that are missed too often. Such a study will involve the analysis of field reports over a period of perhaps a month to determine the actual cleaning frequency.

c. Effect of Parking on Street Cleaning: Parked cars on streets interfere seriously with street cleaning and, when present in large numbers, absolutely preclude the use of the most effective and efficient cleaning methods. In San Francisco, so many of the streets are lined with parked vehicles throughout the day and night that machine sweeping cannot be employed at all except in outlying areas and motor flushing is less effective than it otherwise would be. Relatively expensive hand methods must be used instead of mechanized processes. It is possible to do some hand sweeping under parked vehicles but the results are not entirely satisfactory and much time is required to do the cleaning work. It is reasonable to expect that the cost of street cleaning could be reduced a half million dollars a year if the streets were clear of obstructing vehicles long enough to do the cleaning work. Because of mounting labor rates, both municipal and private operations have had to be mechanized in order to keep the total cost within reasonable limits. For street cleaning, some machines are available and ways should be found to utilize them.

There is no ordinance in effect to restrict the parking of vehicles at curbs except for parking meter locations and a few places of limited time

parking. Under the police code a vehicle may be hauled away after it has been left standing on a street for 120 hours, but this provision does not provide any basis for improving the present situation. The street cleaning officials report instances of cars being left on streets for long periods of time and in some cases the street dirt was packed solidly under the vehicles. It has been reported, and it was observed during the study, that automobile owners frequently leave their cars on the streets instead of putting them in garages. In one block in a residential section 21 automobiles were parked all night in driveways but extending several feet into the pavement area, while the adjacent garages were empty. It cannot be denied, however, that in some areas there may not be enough off-street parking and garage space to accommodate all of the vehicles.

All large cities have faced this problem and many of them have taken action to improve the situation. Numerous cities have ordinances prohibiting parking from 2 a.m. to 6 a.m., partly as a police measure to simplify street patrolling and partly to clear the streets for satisfactory cleaning operations. Cincinnati and Milwaukee are good examples of such control and in those cities the streets are free of parked vehicles at night. Other cities have adopted ordinances requiring that streets be clear of parked vehicles on a specified day once a week. Richmond, Virginia, for example, has posted permanent signs notifying motorists that no parking is permitted during a specific period for a particular street, say from 9 a.m. to 12 a.m. on Wednesdays. In Richmond opposite sides of streets are cleaned on different days so as to leave some parking space available. The plan there has proved of inestimable value.

It is recommended that a comprehensive study be made by the office of the superintendent of street cleaning to analyze garage and parking conditions and to develop recommendations for restricting parking in each street that should be cleared for cleaning purposes.

It is further recommended that suitable ordinances be adopted to prohibit parking on streets to permit the pavements to be cleaned by machine sweepers and flushers rather than by hand sweepers.

d. Effect of Littering on Street Cleaning: During the past year, the street cleaning forces removed more than 115,000 cubic yards of street dirt by truck from San Francisco streets, and, in addition, much more dirt was flushed into catch basins. This dirt comes from the people who use the streets and from the abutting premises. Some waste unavoidably reaches the streets in any large community, but a large quantity is carelessly and illegally placed or thrown on streets. There are several ordinances that specifically prohibit littering the streets and most of them are grossly and flagrantly violated throughout the city without any effective action being taken to halt the practice or even to call attention to the violations. The street cleaning supervisors have distributed printed ordinances calling attention to violations and have taken action against some of the worst violators, but little, if any, headway has been made.

According to ordinance (Section 34 of the police code), owners are responsible for cleaning the sidewalks abutting their properties and for

disposing of the litter. Furthermore, Section 33 of that code prohibits sweeping litter onto streets or onto sidewalks from private premises. Any placing, throwing, or discarding of litter on streets or sidewalks is forbidden. Yet it is a common sight to see householders, store operators, or their employes, sweeping dirt onto sidewalks and then out into the streets. Because the city forces have regularly cleaned up after such illegal littering without much complaint, it is perhaps natural that the practice grows instead of diminishing.

Rather extensive field inspections of littering were made in all parts of the city as a part of this study. Actually, no section or area was found to be free from illegal littering, although the worst violations by far were found to come from business premises rather than from residences. Some small shops and stores discard or sweep litter into the streets. Newsboys are a continuing source of much litter. Several serious instances of littering by the licensed refuse collectors were observed during the study and almost no effort was made to retrieve masses of refuse that fell to the pavement. Much dirt and litter is allowed to fall from trucks, and the worst violators are the truckers who haul sand, gravel, dirt, and similar materials. It was reported that the refusal of some families or persons to pay for regular refuse collection service results in discarding packages of garbage and other wastes in the streets. Some such littering was seen during the inspections. On numerous occasions it was observed that certain streets were full of litter within a few hours after they were cleaned. It is desirable that something be done to stop this littering and thereby halt the waste of street cleaning expense and effort.

Many cities have been able to reduce the littering of streets appreciably through public education and enforcement measures. Some good temporary results have been noted from cleanup weeks and intensive short campaigns, but the more impressive gains have come from continuing programs. It is recommended that a continuing program of public education and enforcement be undertaken by the bureau of street cleaning. The creation of a position of administrative assistant has been proposed in the office of the superintendent of street cleaning, and the responsibility for developing and conducting an educational campaign can well be made one of the duties of that position. It is further recommended that one or more policemen be assigned full time to the bureau of street cleaning to work with the officials of that bureau to enforce the anti-littering ordinances and to assist in public education, that the policemen retain their police status but be under the administrative supervision of the bureau, and that the cost of their services be reimbursed to the police department from street cleaning appropriations. It is believed that the cost of this work will pay for itself many times over, and result in substantially reduced street cleaning requirements.

e. Flushing: Flushing is used mainly as an aid to hand sweeping rather than as a method complete in itself. The flushers are used to jet the street dirt to the curb for collection by the blockmen. This method is particularly effective in cleaning under parked cars. Litter gets caught under car wheels and the cleaning is not complete, but the method is the best that is available. An analysis of the nine regular flushing routes and three week end routes reveals the following information:

Route No.	Truck No.	Capacity (gals)	Gallons of Water Per Curb Mile	Curb Miles Per Tank	Blocks Per Tank	Miles Per Equipment Hour
1	354	1500	1071	1.40	5.48	5.6
2	328	1500	871	1.72	9.17	4.8
3	328	1500	832	1.80	9.44	5.0
4	327	1250	842	1.48	7.76	6.3
5	330	1500	1287	1.17	3.70	5.7
6	367	2500	1440	1.74	7.41	6.2
7	329	1500	1003	1.49	6.81	4.5
8-9	368	2500	1661	1.50	7.86	5.3
10	326	1500	1137	1.32	4.94	5.2
Sat.a.m.	329	1500	1184	1.27	6.36	6.9
Sat.p.m.	329	1500	1263	1.19	5.44	7.0
Sun.a.m.	329	1500	1263	1.19	6.06	7.0
Averages			1168	1.45	6.46	5.5

It was noted in a typical week that about 24 percent of the time is spent in filling the flushers, based on the observed time of five minutes a filling. During the week of April 23 to 29, 1951, there were 79.8 hours out of the 332 working hours for flushers devoted to filling. This is somewhat high for the methods used here which do not require large volumes of water. It will be noted from the above table that there is a wide variation among routes in the amount of water used for each mile flushed - from a low of 832 to a high of 1661 gallons for each curb mile. It is understandable that certain streets may require more or less water than others, but it is unlikely that entire routes would be so different. It should be noted that the 2500 gallon flushers are not flushing more curb miles per tank than are the smaller units, and the only difference in performance is that more water is used. The week end routes also have some interesting aspects. The flushers travel at a somewhat higher rate of speed, and consequently have a higher production rate. Also, as might be expected, there are more fillings on a four hour week end shift than there are on regular shifts for the same length of time.

Under present conditions, flushing is one of the best methods available and its use should be extended. If streets can be cleared of parked cars, it is believed that more water should be used so as to carry the street dirt along the curbs and thereby eliminate a large amount of sweeping. The combined use of flushing and machine sweeping could be considered also when the parking situation is improved.

f. Machine Sweeping: About 31,000 curb miles of street sweeping is done annually with the ten motor pickup sweeping machines operated by the bureau. It is the policy of the unit to use machine cleaning on all streets that are reasonably free of parked cars, but there is a definite limit to the extension of this method until parking controls are established. A rough check

shows the approximate cost to be $2.10 for machine sweeping a curb-mile of street in comparison with about $7.15 for gang sweeping a curb-mile. The possible savings make it worthwhile to devote time and effort to enable the method to be used more extensively.

An analysis of motor sweeping work during April of this year shows the following:

Route No.	Machine	Curb-Miles Per 8-Hour Shift	Curb-Miles Per Equip. Hr.	Blocks Cleaned Per Dump	Curb-Miles Per Cu. Yd. of Dirt
1	Austin Patrol 307	11.0	1.4	7.1	2.67
2	Austin Patrol 308	17.0	2.1	11.8	2.83
3	Austin 40 365	20.3	3.5	15.0	2.65
5	Elgin 321	16.8	2.1	27.7	3.06
5N	Elgin 321	20.9	2.3	24.1	2.66
7	Austin 40 361	22.6	2.8	20.6	2.61
8	Wayne 369	20.0	2.5	37.4	3.03
Sat. a.m.	Elgin 315	28.0	3.5	35.5	2.80
Sat. p.m.	Austin 40 365	32.0	4.0	26.5	4.00
	Averages	19.3	2.4	20.7	2.84

In most cities the rate of cleaning at night is somewhat slower than day sweeping, but it is interesting to note that the night cleaning crew in San Francisco does more cleaning than most of the day crews. The small sample of operations does not reveal any significant difference among the four types of sweeping machines that are used. It would be desirable to investigate the cost of cleaning a curb-mile of street for each type of machine, but the necessary records are not available.

The cleaning rate of about 19 curb miles during an eight-hour shift is somewhat less than the average for American cities, but this is explained in part by the considerable amount of working time that is used to care for the equipment. It is the practice to require the machine chauffeurs to keep their equipment washed and polished, to change brooms as necessary, to grease the sweepers, and to make adjustments and minor repairs. This work is done in regular working hours and, of course, decreases the time of machine use. In one week, machine No. 321 was out of service for parts of four days for servicing - one day for washing and changing brooms, one day for greasing and adjusting shoes, one day for changing broom, and one day for service and changing gutter broom. On the fifth day, when no servicing was done, 84 blocks were cleaned but on the other days, only 40, 39, 52, and 50 blocks, respectively, were swept. This is not effective utilization of the equipment, and for the week studied, six machines could have done the work of the seven used if they were sweeping eight hours a shift. It is recommended that motor sweepers be operated full time by the chauffeurs for actual street cleaning, and that

servicing be done outside regular shift hours. This matter will be discussed with other equipment management activities in another section of this report.

g. Gang Sweeping: A large mileage of streets outside the business and other congested areas of the city are cleaned by the gang cleaning method. Normally, the streets in gang sweeping districts are swept from once a week to once in two weeks. There are ten gangs regularly used for this work, and each gang is made up of a labor subforeman, from four to eight hand sweepers, and a truck with a chauffeur and two lumpers. Typically, the foremen, sweepers, and lumpers report for work on their routes. One or more tool boxes are provided on each route for storing the brooms and shovels and the belongings of the crewmen. The trucks start an hour later than the sweepers, but the lumpers sweep until they are need for loading. This is excellent practice and undoubtedly saves many man hours each month. An analysis of gang sweeping work for the week of August 23 - 29, 1951 is shown in the following tabulation:

Route No.	Foreman and Truck		Man Hours[a] Sweeping	No. of Loads	Cu. Yd. Sweepings	**Blocks Cleaned**	Curb Miles Cleaned	Man Hour Per Curb-Mile	Cubic Yards Per Curb-Mile
1	Cook	357	256	5	58.75	352	80.32	3.18	.73
3	Carey	362	192	5	58.75	617	140.80	1.36	.42
4	Wright	331	200	5	47.50	449	102.46	1.95	.46
5	Espinosa	333	272	6	57.00	419	95.62	2.85	.60
6	Gigliati	363	280	5	58.75	480	109.54	2.56	.54
7	Capriola	358	240	5	58.75	379	86.48	2.78	.68
8	Freienstein	359	272	5	58.75	341	77.82	3.49	.75
9	O'Neill	364	248	5	58.75	485	110.68	2.24	.53
10	Foley	360	240	5	58.75	405	92.42	2.59	.64
11	Sheehan	349	272	7	82.25	466	106.34	2.56	.77
	Totals		2472	53	598.00	4393	1002.48	Av.2.47	Av..60

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a/ Man-hours for the week include those for the working foreman and sweepers but not for the chauffeur or lumpers.

It will be noted that there is a very wide variation in the production of the gangs; one gang for the week required only 1.36 man-hours to clean a curb-mile of street, while at the other extreme another gang needed practically 3.5 hours for the same work. In partial explanation of this difference it will be noted that almost twice as much street dirt was collected for each curb-mile from the high-production route as from the low-production crew.

The small number of loads of dirt should also be noted. Eight of the 10 routes collected only one truck load a day which means at the most only 11-3/4 cu. yds. or 9-1/2 cu. yds., depending on which size truck is used by a particular gang. Two matters here seem to require attention. First, the

amount of sweepings represents a very small day's work for two loaders, and second it would appear that the trucks may be too large for the job. Further studies should be made by the bureau in both of these matters. Considering the very short hauls that now exist (under four miles), small trucks would probably prove more economical. Actually, with a small truck from 30 to 40 minutes extra would have to be spent each day to make an additional run to the dump, but there is normally about ten dollars a day difference in the cost of a small and a large truck. It is estimated that a 5-3/4 cu. yd. truck would cost $12.00 a day and a chauffeur $15.60 a day, totaling $27.60, whereas a 11-3/4 cu. yd. truck would cost about $18.00 a day and a chauffeur $19.36 a day totaling $37.36. There is nothing to indicate that the lumpers could not load all of the sweepings if 40 minutes were taken from a day for a trip to a dump, since the trucks ordinarily leave the routes for the dumps at four o'clock except in unusual instances. The extra trip to a dump would result in about 80 minutes additional sweeping time by the lumpers. At the worst, if it takes until 4:30 p.m. to load the collected material, the lumpers could report a half hour later in the morning and still do as much sweeping as they do now. The $100 a day saving should be attractive, a total of about $25,300 a year for the 10 gangs. It is recommended that consideration be given to the use of smaller trucks on gang sweeping work.

The gang sweepers now do considerably more than just sweep the pavements. They frequently sweep or pick up paper and street dirt from sidewalk and from vacant, privately owned lots in order to improve the appearance of the streets and to prevent the material from blowing into the pavement area. The property owners are responsible for sidewalk cleaning and for keeping vacant lots clean, but when they neglect it the sweepers are allowed to collect the material from the sidewalks and from the front 25 feet of vacant lots. If the property owners would do their part, the cleaners could sweep many more miles of street a day. The gang sweepers also are required to clean the pedestrian stairways and the underpasses on their routes and must keep city-owned lots free from debris.

The gang sweepers now spend a considerable part of their time cutting and removing the grass and weeds that grow in the gutters and along the curbs. There is no record of the time spent on this work, but some estimates allocate 25 percent of the gang sweepers' time to this work. The vegetation is simply cut off at the pavement or curb level and no attempt is made to remove the root or to kill the plants, so the job is a continuous one under the present methods. Some of the street cleaning officials believe that this work should be done by separate gangs and not made a part of the regular gang sweeping work. It is believed that there is merit in making such a change, but it would be far better to kill the weeds and grass and prevent recurrence of the difficulty. Many cities have found that the weeds can be killed effectively without destroying trees, shrubs, or lawns by the careful selection of a weed killer solution. Normally, a single crew would be able to do all weed killing work in the city because a unit can cover many curb-miles a day. Some cities use motorcycles and sidecars for this work, but others have found that jeeps or other small trucks are more satisfactory for production work. One man can do the entire job, if proper spray controls are provided, but two men permit almost continuous application of the weed killer by mixing the solution on the job. It is recommended that a separate weed killing crew be organized and provided with modern weed killer spray equipment.

The gangs now have to clean occasionally the streets that are normally machine swept because the machines cannot remove the weeds or collect paper from sidewalks or vacant lots. It is not believed that this work is properly a part of gang sweepers' duties, and if the weed removal is otherwise performed, it may not be necessary to divert the gangs from regular gang sweeping routes. The paper trucks should be assigned to pick up litter from sidewalk and lots in machine cleaning areas. It is recommended that the gangs be used as much as practicable on regular gang sweeping routes and that other means be used to supplement machine sweeping when necessary.

h. Blockman Cleaning: Blockman patrols are used to hand sweep the gutters in business streets and in other heavily congested areas. There are 132 such patrols established, of which 39 are in the central district, 44 in the northern district, 26 in the southwest district, and 23 in the southeast district. Each blockman is assigned a beat which may be from 4 blocks to 100 blocks long, depending on the character of the street. The shorter routes are cleaned two or more times a day, while it may require two or three days to sweep the longer ones. A blockman is normally provided with a sweeper buggy, a broom, a scoop, and a shovel. In heavy traffic a buggy is not always used, but instead, street cleaning cans into which a blockman can empty the debris collected in his scoop are placed at strategic locations at the curb. There are 22 routes that do not use buggies. In the less congested areas, the extra cans for the blockman are kept in can sheds which are located at the curb line in the less conspicuous places. Each shed has room for six cans and ordinarily there are two sheds on a beat. The bureau has 764 cans and 144 sheds in this service.

Each blockman is responsible directly to the district director in his area. He makes no written reports on progress or performance. Consequently there is no opportunity to make comparative analyses of effectiveness or effort. Apparently, a district director's appraisal of the cleanness of a beat and his observance of cleaning during his rounds are the only bases of judging the acceptability of the work done. It is recommended that a simple report be made by each blockman in terms of the assigned task. If his beat contains one curb mile to be cleaned twice a day, the blockman might simply make a check to show that the task was done completely, or he would state how much less, or how much more than the allotted task was done.

The blockman method is not a desirable one. It is cumbersome and relatively expensive, but it is still the best known means of cleaning gutters in congested areas. An effort should be made to reduce the extent to which it is used, particularly if some control of parking is realized and if gains are made in curbing careless littering.

i. Collection of Material from Cans and Baskets: There are six truck crews assigned regularly to the work of collecting the street dirt that the blockmen have placed in the street cans and the litter that pedestrians have placed in the wire street litter baskets. Three of the collection routes are north and three are south of Market Street. An analysis of the operations of the six crews and the special week end collections for the week of April 23-29, 1951, is presented in the following tabulation:

		No. of Collections							
Route No.	Truck	No. Baskets	No. Can Sheds Serviced	No. of Cans from Sheds	No. of Single Cans	Total No. Collections	Miles	No. of Loads	Collections Per Man Hour
NOM #1	Heil 355	0	12	345	620	965	215	10	8.04
NOM #2	Leach 302	105	31	795	305	1205	190	10	10.04
NOM #3	Leach 303	130	37	924	390	1444	275	9	12.03
SOM #1	Heil 356	255	18	580	600	1435	184	10	11.96
SOM #2	Leach 304	105	27	720	265	1090	187	10	9.08
SOM #3	Leach 301	0	17	421	720	1141	246	10	9.50
Sat. Job 28	304		14	81	129	210	22	1	17.50
Sat. Job 36	304		14	80	50	130	21	1	10.83
Sun. Job 33	302		23	112	13	125	19	1	10.41
Sun. Job 34	344		9	54	110	164	24	1	13.67
Sun. Job 35	304		9	50	128	178	21	1	14.83
Totals		595		4162	3330	8087	1404	64	Av. 10.37

On each route, a 13-1/2 cu. yd. bucket loader truck is used, and the crew consists of a driver and two lumpers. As can be seen in the tabulation there is a substantial difference in the workload and performance of the various crews for the week, varying from 965 to 1444 collections from baskets, can sheds, and single cans. The crew that made the most collections traveled the greatest distance, so the spacing of the cans does not seem to explain the discrepancy. Except for route SOM #1, the collection from can sheds seems to be somewhat more rapid than emptying single cans.

The week end operations for this activity seem to be somewhat more productive than regular week day collections. One crew on job No. 28, made 210 collections in four hours in comparison with the average of 242 weekday collections in eight hours.

j. Operations of Paper Crews: The so-called "paper" trucks generally do special street cleaning tasks to help out other street cleaning crews. Although each paper crew has a set of assigned locations to check regularly, and a regular cruising route, it may frequently be diverted to handle complaints or to fill in for absent truck crews in other parts of the work. The paper truck assignments generally overlap those of motor sweeping or gang sweeping crews. A summary of paper truck crews' activities for the week of April 23-29, 1951, is given in the following tabulation:

Route No.	Truck (9-1/2 cu. yd.)	No. of Locations Worked	Miles	Loads	Cu. Yds. Collected	Cu. Yds. Per Crew Hour
A	334	126	148	6	57.0	1.43
B	346	137	164	5	47.5	1.19
C	341	133	149	5	47.5	1.19
D	342	191	158	5	47.5	1.19
E[a]	Rental	60	197			
F	340	96	149	7	66.5	1.66
G	318	154	156	6	57.0	1.43
H	332	135	234	8	76.0	1.90
I	343	58	161	5	47.5	1.19
J	345	175	200	7	66.5	1.66
	Totals	1265	1716	54	560.5	Av. 1.56

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a/ Although this truck is placed in the series, it is not a paper truck but is used for utility purposes.

Because of the varied nature of the work there is no satisfactory measure of accomplishment or performance for the crews. The amount of refuse or litter collected might be a suitable comparison, but there are some activities that do not result in a great quantity of collected material. When the crews are picking papers along streets or from city-owned property, for example, the quantity is usually small.

It was not possible during the study to make an adequate investigation of the paper truck activity, but on the basis of limited field inspections and an analysis of several weeks' records, the value of this method of cleaning is believed to be overrated. It would seem to be better to organize the work so that one and only one crew is responsible for keeping any street clean. As soon as one crew does spot cleaning work in another crew's area, it becomes difficult, if not altogether impossible, to hold either crew responsible. If instead, for example, a paper truck were assigned to a subforeman to assist in a gang sweeping area, the jobs could be coordinated effectively and the foreman could be held accountable. It is recommended that a careful study be made of paper truck operations and of the effect of the activity on other cleaning work so that either the present plan may be justified or a new scheme of organizing the work developed.

k. Produce District Cleaning: Street cleaning in the produce market district of the city is largely a job of garbage collection. It is reported that the produce dealers in this district do not have regular refuse collection service and generally do not have containers for their waste materials. Judging from the appearance of the streets in this area, the wastes are simply thrown into the gutters for the street cleaning forces to collect. This condition should be corrected. The result is that the city is now providing refuse collection service to the merchants of this area at public expense when such service is denied other citizens. Under existing ordinances these merchants are required to subscribe to the regular scavenger service. In any case, the

present practice of throwing garbage promiscuously on the streets is very unsatisfactory and constitutes a public health nuisance.

The job of cleaning the market area is a big one, particularly because of the difficulty of sweeping the material from around and under standing vehicles. The merchants of the area employ one hand sweeper who is supposed to sweep the produce refuse into piles so that the street cleaning crews can load the material easily. During the inspections of this area, it was observed that a large amount of refuse was scattered over the streets and under the standing trucks. It is evident that one sweeper cannot do much to cope with this difficult situation.

The street cleaning work in this area is done in the afternoon, five days a week. Two of the bureau's special truck crews, each consisting of a chauffeur and two lumpers, devote each afternoon to collecting refuse and cleaning the streets of the produce area. It is recommended that the produce dealers and other occupants of this area be required to employ scavengers to remove their garbage and other waste materials and that they be required to provide regular containers for storing the materials. It is further recommended that the ordinances concerning littering the streets and keeping sidewalks clean be strictly enforced in the produce district.

l. Park Maintenance on Junipero Serra Boulevard: The bureau of street cleaning now maintains a small park on Junipero Serra Boulevard from Holloway to Ocean Avenues, called Ingleside Park. A full-time gardener, on the street cleaning payroll, spends his entire time mowing and caring for the area and planting. Obviously, this work has little relation to street cleaning activities. It should be transferred to an agency that is able to provide qualified supervision for the operations and that is regularly conducting this kind of work. It is recommended that the responsibility for maintaining this park be transferred to the recreation and park department of the city and that the gardener and the park maintenance equipment be transferred to that department.

m. Complaints: Complaints on street cleaning matters are investigated very promptly by the bureau and, normally, immediate action is taken to correct unsatisfactory conditions regardless of whether the complaints are justified or not. Most of the complaints on street cleaning are telephoned directly to the office of the bureau, and a complaint form is made out at once for the district director concerned unless emergency action is necessary.

Emergency cleanings after accidents are usually handled by the special crews that operate directly under the supervision of the superintendent. Especially important or urgent complaints may also be investigated and corrected by these special crews.

No written reports are made on the complaint actions so there is no record showing which ones are legitimate and which are not, or which ones are due to the failure of forces to clean or inspect the streets, steps, or underpasses. It is recommended that complaint forms be made in duplicate so that one copy may be given to the proper supervisor to inspect, correct, and report on the inspection and action taken, and the other may be used as an office control copy.

n. Week End Cleaning Activities: The tendency at the present time is to view street cleaning as a weekday operation rather than a continuing job. It may reasonably be expected that those streets that are scheduled to be cleaned three times a week, twice a week, once a week, or less frequently, can be and should be cleaned during regular weekday hours. There are other streets that need cleaning on Saturdays, Sundays, and holidays as much as on other days and, in some locations, week end cleanings are even more important.

The week end work is now being done on an overtime basis and, because of the extra cost, there is a natural tendency to do only the most urgent cleaning. It seems reasonable, however, that the week end cleaning work should be viewed and accepted as regular government operations just as is the continuing operation of a pumping plant or the conduct of recreation activities. If such an agreement could be made, it would be possible to stagger the days off for some employes so that Saturday, Sunday, and holiday activities would be treated as regular and necessary work. About $25,000 would be saved by such means. It has been recommended in a preceding section that efforts be made to have street cleaning work accepted as a necessary continuing government activity, so that regular assignments to do the essential week end work can be made without extra compensation.

o. Street Cleaning Reports: A large quantity of operating information is regularly submitted on daily reports by all street cleaning forces except the blockman force. Although extensive reports are made each day, the kind of information furnished and the units of work used are not the best and, therefore, the data are less useful than they should be. Nevertheless, much valuable operating and management information could be provided by a careful analysis and summarization of the data now available. Unfortunately, the information is not used to help in the administration of the street cleaning work. Certain information on operations is recorded by the bureau of accounts in addition to the payroll information that is regularly and promptly prepared. This information is reported monthly in the form of an operating report to show the average number of pieces of equipment used, the amount of water used, and the amount of dirt picked up. There is no unit cost information, and no comparative performance or progress data for the various crews. In short, the report is almost useless for the purpose of supplying supervisors with essential information on operations.

The field reporting should be both simplified and improved. Instead of requiring the foremen and chauffeurs to report in detail each street or location worked and to show the number of blocks cleaned, it would be far better and easier and it would be more accurate to have the length of each route measured in curb-miles. Under this arrangement, the field employes would have to report only the route number and whether the route was completely covered during the shift, and, if more or less work is done, to list the streets that could not be covered or the extra streets cleaned. An office clerk could then scale from a map the mileage of the shortage or overage and record the total curb-miles cleaned. The routes are well defined now. It is recommended that the "block" unit of measure be abandoned and be replaced by a curb-mile unit, and that each route be carefully measured in curb-miles as the basis for simplified field reporting.

The superintendent now maintains in excellent form the basic street cleaning assignments, the detailed descriptions of routes and tasks for each operating group or crew, and other essential information on operations for regular weekday work, for regular week end operations, and for special assignments. This information is kept in loose leaf manual form in a book called the "bible" by the supervisors. The superintendent is to be commended for the completeness and form of this manual.

The employes in charge of crews, and even the blockmen, are given considerable latitude in determining the sequence of the cleaning work on the various routes. There is no objection to this procedure because usually the workers will find the best and most effective order of work on a route, but once the best plan has been determined, it should be established in the manual and become the official order of work. There is now no such record. It is recommended that the approved sequence of work or route of travel be officially established for each regular assignment.

There is now some carelessness in making field reports, by listing the locations out of the actual order of the work done, by failing to record certain work, or by showing the wrong quantities. Numerous errors were found in the examination and analysis of the daily reports. Several of the enumerated block lists were not totaled at all, and in many instances the time of leaving for dumps was not recorded and sometimes no record of loads was made. The employes can hardly be blamed for laxity in reporting because most of them soon become aware that no use is made of the reported information. When adequate comparative operating data are made available through good reporting procedures and proper analysis, performance progress and unit cost information for each crew will be available. Some weaknesses will be evident immediately from the summary reports, and many irregularities, that must be satisfactorily explained by operating personnel, will be disclosed. Through the use of reports and records as an aid in administering street cleaning procedures, the employes who prepare the reports will become conscious of the value and purpose of the field reports and will become aware that they are being studied and analyzed. Better reporting is certain to follow, but any instance of missing or inaccurate reporting should be brought to the attention of the individual concerned.

It is recommended that summary reports of performance and progress be prepared by the bureau, each week, for each crew, each activity, and each district, utilizing suitable units to show comparative effectiveness, and that each district director, the superintendent, or the department officials concerned be provided promptly with copies of the reports. It is further recommended that monthly summary reports be prepared to show both performance and unit cost data for each crew, for each activity, and for each district.

5. Street Cleaning Equipment

a. Present Equipment: In general, the bureau is provided with an ample amount of equipment, although some of it is many years old. The newer equipment is excellent as to type and kind, but there may be some question if it is of the proper size. The kind, make, and size, of the 61 pieces of automotive equipment of the bureau and the date of acquisition are shown in the following tabulation:

Passenger Cars

	1	Dodge Tourer	1938
	1	Chevrolet Coupe	1940
	2	Chevrolet Coupes	1947
	1	Ford Coupe	1948
Total	5		

Dump Trucks, Covered Body

	1	Mack	5 cu. yd.	1930
	1	Mack	9-1/2 cu. yd.	1930
	3	Mack Jr.	9-1/2 cu. yd.	1937
	2	GMC	9-1/2 cu. yd.	1937
	6	GMC	9-1/2 cu. yd.	1938
	1	GMC	11-3/4 cu. yd.	1944
	2	GMC	11-3/4 cu. yd.	1945
	1	GMC	11-3/4 cu. yd.	1948
	4	GMC	11-3/4 cu. yd.	1949
	3	GMC	11-3/4 cu. yd.	1950
	3	GMC	11-3/4 cu. yd.	1951
Total	27			

Dump Trucks, Bucket Loading Type

	2	GMC	Leach	13-1/2 cu.yd.	1944
	4	GMC	Leach	13-1/2 cu.yd.	1947
	2	GMC	Heil	13-1/2 cu.yd.	1948
Total	8				

Flat Bed Trucks

	1	Chevrolet	1 ton rock	1937
	2	Dodge	1 ton rock	1934
Total	3			

Motor Flushers

	1	International	1250 gallon	1938
	3	GMC	1500 gallon	1939
	1	Mack	1500 gallon	1944
	1	Autocar	1500 gallon	1949
	2	GMC	2500 gallon	1950
Total	8			

Motor Sweepers

1	Elgin Std.	2-1/2 cu.yd.	1936
3	Austin Patrol	3/4 cu.yd.	1944
1	Elgin Std.	2-1/2 cu.yd.	1945
1	Austin Patrol	3/4 cu.yd.	1947
3	Austin 40	2 cu.yd.	1949
1	Wayne	3 cu.yd.	1951
Total 10			

In addition, a small utility truck is rented.

b. Responsibility for Equipment Control: There appears to be some difference of opinion among municipal officials as to the allocation of responsibility for the management of equipment, the ownership, and the authority of the purchasing department over the care and administration of the vehicles. It is contended by some that the ownership of all vehicles rests in the purchasing department and that, therefore, that department is charged with the management of the equipment.

Actually, the street cleaning equipment belongs to the City and County of San Francisco and is purchased for and assigned to the bureau of street cleaning. As far as could be determined, no agency outside the department of public works interferes with the control and management of the equipment except, perhaps, by limiting the amount of money that may be expended for maintenance and operations. The purchasing department operates a central repair shop, but only work specifically ordered in writing by the bureau of street cleaning is undertaken, and the costs of the work are charged to street cleaning accounts. The department of public works exercises almost no systematic independent control over equipment care or management. It seems clear that such responsibility must now be accepted by the bureau, or that an acceptable management service must be provided otherwise.

c. Retirement of Equipment: It will be seen from the equipment list that 30 of the vehicles (practically 50 percent of the total) were acquired before 1945, and that 22 of them were purchased before 1940. It is evident that there has been no consistent policy of replacing street cleaning equipment when it had served its economically useful life or even when it is practically worn out. Normally, the economical life of street cleaning trucks and machines varies from five to eight years, although in some cases it is possible to use such equipment for as long as ten years without greatly increasing the cost of operation and maintenance. The matter, however, should not be one of speculation or opinion. The city should keep accurate cost data for its equipment to determine when an item of equipment should be replaced to secure the most efficient operation, just as any large private fleet management must and does exercise this kind of control. It is recommended that each item of street cleaning equipment be disposed of when its economically useful life is ended, and that it be replaced if necessary and desirable. This proposal would demand that at least 22 pieces of present equipment be retired, only four of which are not used now. It may not be possible or practicable to replace this number in one year. If it is not, then a definite replacement program

should be adopted to secure that the same result will be achieved over a fixed period of time, say four or five years.

d. Care of Street Cleaning Equipment: Under the present arrangements, the responsibility for the management and care of the equipment of the bureau is divided between several operations employes. Each chauffeur is expected to take general care of his truck or machine, to report any adjustment or repairs needed, to wash and polish the equipment, and to make simple repairs. A special chauffeur, attached to the office of the superintendent, is responsible for dealing with the central repair shop on all matters affecting the repair, greasing, and fueling of equipment. He sees that repair work orders are prepared, that extra equipment is assigned when breakdowns occur, and that the defective trucks or machines are brought to the shop. He maintains liaison with the superintendent of the repair shop and authorizes desirable additions to work orders after the working parts of vehicles are exposed and can be inspected.

The need for providing a positive management for department equipment is discussed in another part of this report, and it is intended here only to direct attention to the absence of such positive management of street cleaning equipment, to the failure to provide preventive maintenance inspections and maintenance, to the lack of adequate equipment records and costs, and to the general need for better equipment administration.

e. Equipment Cost Records: The bureau of accounts keeps records of the equipment expense that is reported monthly by the purchasing department. As of November 15, 1951, the records have not been completed for the 1950-51 fiscal year, and it was necessary to use those of 1949-50 for analysis and discussion. A summary of the recorded data for 1949-50 is given by classes of equipment in the following tabulation:

Class of Equipment	No. of Vehicles	Aver. Miles Run	Aver. Cost Per Mile	Aver. Miles Per Gallon	Average Expense per Vehicle				
					Repairs	Tires	Gas and Oil	Misc.	Total
Dump Truck 5 cu. yd.	1	191	.2403	2.36	27.26	3.47	14.51	.67	45.91
Dump Truck 9-1/2 cu.yd.	12	6872	.1211	3.96	280.04	124.42	312.02	15.26	731.74
Dump Truck 11-3/4 cu.yd.	8	6808	.0986	3.89	182.65	123.68	320.31	22.56	649.20
Dump Truck 13-1/2 cu.yd.	8	8653	.1177	4.43	404.25	157.44	362.75	25.70	950.14
Flat Bed Trucks 1 ton	2	328	.1185	4.75	21.45	5.96	12.97	1.00	41.38
Motor Flushers	6	8631	.1565	2.73	573.28	156.80	583.34	37.39	1350.81
Motor Sweepers	8	3213	.4442	2.88	903.93	58.36	207.51	162.23	1332.03

Equipment acquired since 1949 is not included in the above summary. Because the equipment records are not up to date, their usefulness to the bureau of street cleaning is reduced considerably. However, even if they were up to date, so much data on expense and use is omitted from the records that their value as an aid to administration of street cleaning operations is questioned. Although bureau of street cleaning personnel do a large amount of work on the equipment, the cost of such work is not charged to the equipment. Thus, the equipment records are not only misleading, but too much time and expense is charged to actual street cleaning operations. For example, each truck crew devotes at least two hours a week to washing and cleaning its equipment, and the cost is charged to street cleaning operation rather than to equipment maintenance. Machine sweeper operators not only clean and polish their machines but change brooms and make certain adjustments and repairs, and again the cost of this work is not charged to the equipment or included in the above data and costs. Some of the special truck crews that work out of the main street cleaning yard do some work on equipment and make gutter brooms for sweepers, the cost of which work should be added to equipment expense. Depreciation cost is not included in the records nor is the expense attendant on storing the equipment. Under the present circumstances, the equipment records are incomplete and practically useless for the purpose of showing the equipment component of expense in operating costs.

The records, however, do provide considerable information that is of value in analyzing the comparative effectiveness of different kinds, types, and sizes of equipment. It is also useful in justifying the replacement of equipment or the selection of certain kinds of equipment. The records are kept on visible index cards and are totaled and averaged for the year, but no report is prepared giving the cost and performance data for the equipment. Very little use is made of the records by the bureau of street cleaning.

Whatever plan of equipment management is decided on, it is recommended that equipment records be maintained for street cleaning vehicles and machines to show the total cost of owning, operating, and maintaining each piece of equipment, and that monthly reports of the use and cost of equipment be prepared for administrative guidance.

f. Maintenance by Operating Personnel: It is desirable in any operation for the drivers of trucks and machines to take an interest in keeping the equipment clean, attractive, and in good condition, mechanically. There is a real doubt, however, as to how much work the crew should do on their vehicles and as to whether or not it should be done in regular operating hours. There is little doubt that the present practices are extravagant. When a truck crew consisting of a chauffeur and two lumpers quit work an hour and a half early in order to wash and clean their truck, there is that much time lost on street cleaning work, and the cost of $8.73 for their time should be charged to equipment maintenance which is expensive for one cleaning job. In order to get full utilization from equipment, it should be kept in operation for the maximum time. It is recommended that the servicing and regular maintenance and care of equipment be done outside regular shift hours, preferably by a regular service crew.

g. Equipment Reserves: There should be available sufficient reserve equipment so that trucks and machines may be regularly inspected and maintained on schedule and so that equipment may be replaced promptly in case of accident or breakdown. Actually, such reserves are not available and operating losses, involving the loss of many man-hours of crew time, occur frequently when vehicles are out of service. The practice at the present time is to replace brokendown equipment with such trucks or machines as are not in use, but when operations are normal, the only spare equipment is the discarded, obsolete, and work-out trucks and machines that have been kept by the bureau. It is neither economical nor advisable to assign equipment that does not meet the requirements of the work or that is liable to breakdown. There are eight flushers for nine routes which means that one unit must be used both day and night. One mechanical sweeper is normally used on a day and then on a night shift. Such use is justified if proper preventive maintenance can be given, but not under the present practices.

Sometimes when there is no spare equipment that can be assigned, the operating crew goes to the repair shop with the equipment and stays there until the repairs are made. The employes in such cases are expected to assist with the repair work, but it is reported that they normally are not effective on this kind of work.

It is recommended that an adequate amount of reserve equipment be provided in order to make scheduled preventive maintenance inspections and maintenance possible and in order to prevent the loss of many man-hours of time when equipment becomes inoperative. It is believed that a minimum of one extra flusher, one machine sweeper, one bucket loader truck, and one covered dump should be provided. In this connection, it is the responsibility of the department and bureau officials to operate the extra equipment as a true reserve and not to add crews because some equipment may be available.

h. Motor Sweeping Equipment: An analysis of the records of the eight motor sweeping machines that were operated during 1949-50, the last year on which data are available, is presented in the following tabulation:

				Expense			
Machine	Miles Run	Cost Per Mile	Miles Per Gallon	Shop Repairs	Tires	Gas & Oil	Total
306 Austin Patrol (1947)	2722	.2890	3.25	471.74	49.45	150.33	786.64
307 Austin Patrol (1944)	3132	.5946	3.52	1515.31	56.90	157.66	1862.33
308 Austin Patrol (1944)	2590	.6234	2.74	1291.67	47.05	166.86	1615.12
309 Austin Patrol (1944)	2014	.6945	2.96	1158.59	36.59	118.33	1398.69
Total	10458	-	-	4437.31	189.99	593.18	5662.78
Average	2614	.5506	3.18	1109.44	47.50	148.29	1415.69
315 Elgin (1945)	4445	.4059	2.35	1065.09	80.75	341.63	1804.41
321 Elgin (1936)	2825	.4570	1.94	776.76	51.32	251.64	1291.15
Total	7270	-	-	1842.85	132.07	603.27	3095.56
Average	3635	.4315	2.15	921.42	66.03	301.63	1547.78
361 Austin 40 (1949)	5506	.2273	3.08	604.53	100.03	314.07	1251.49
365 Austin 40 (1949)	2467	.2616	2.91	346.72	44.82	149.53	645.42
Total	7973	-	-	951.25	144.85	463.60	1897.91
Average	3986	.2445	2.98	475.62	72.43	231.80	948.95
All Sizes Totals	25701	-	-	7231.41	466.91	1660.05	10,656.25
Averages	3213	.4442	2.88	903.93	58.36	207.51	1,332.03

Two additional machines are now in service. There are no data on the life of main or gutter brooms.

The low mileage of these machines indicates that they were out of service for substantial periods either because of weather or repair. The average mileage on working days is 20 curb-miles which would total over five thousand miles a year for full-time single-shift operation. The patrol sweepers averaged 2614 miles, just a little over half-time use. The larger machines show 3635 and 3986 miles, which is better, but is still short of desirable use.

It will be seen in the tabulation that the small sweepers show a much higher cost per mile than the larger machines, although, as may be expected, the operating cost is less. It may be pointed out, in this connection, that the patrol sweepers are much older and that three of them were six years old when these records were made. The two Austin 40 machines had just been placed in service and consequently the repair expense was very low. A much more extensive analysis of cost would be necessary to provide suitable information on which to base operating decisions.

There is a tendency among the street cleaning officials to favor the larger sweeping machines, mainly because of the larger dirt carrying capacity and consequently fewer dumps. On the other hand, it is pointed out that the cleaning work is done at the gutter and that a four foot swath is practically as effective as a five or six foot swath, and that the smaller machines are very much less expensive to purchase. The decision with regard to desirable equipment size, however, should be made on the basis of the curb-mile cost of cleaning streets, because the officials say that the machines do equally effective work. No such costs are available now, but they should be produced and used in the administration of the bureau.

i. Size of Trucks: Some comments were made in the discussion of street cleaning procedures, to the effect that overly large equipment is provided for certain operations, particularly for gang sweeping work on which only a small amount of dirt is collected daily (less than 11-1/2 cu. yds. a day). It is certain that smaller equipment costs less to operate and to maintain, but the optimum size for any operation should be determined on the basis of the unit cost for doing a particular operating job. It may be desirable to test out several different sizes and designs of equipment to permit an intelligent decision, and it is recommended that this be done and that accurate costs on each different operation be compared.

6. Street Cleaning Expenditures

a. Present Expenditures: The gross and net expenditures for street cleaning for 1950-51 and the budget for the current fiscal year are given in the following tabulation:

Type of Expenditure	1950-51 Expenditures Gross Expenditure	 Reimbursed for State Highway Work	 Net Expenditures	1951-52 Budget
Permanent salaries a/	$ 30,741	$ 1,102	$ 29,639	$ 36,798
Wages	1,154,428	43,537	1,110,891	1,225,018b/
Repairs to equipment (shop)	49,199	2,217	46,982	52,107c/
Truck and team hire	5,328	-	5,328	5,076
Other contractual services	3,596	-	2,596	-
Heat, light, and power	-	-	-	125
Gasoline and oil	18,067	1,176	16,891)	23,000
Other supplies and material	10,213	1,319	8,894)	
Equipment	35,480	3,622	31,858	13,400
Services to other departments	3,021	-	3,021	3,473
Totals	$1,309,073	$52,973	$1,256,100	$1,358,997
Estimated reimbursement from State				53,019
Gross budget				$1,412,016

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a/ Including amounts for overtime allowance and holidays.
b/ Including $114,120 allowed for increased wage rates.
c/ Including other contractual services.

In actual practice the budget is prepared and adopted on a net basis, and the reimbursements from the state highway department for street cleaning work on state highway routes are deducted from actual expenditures as they are received. The accounts do not readily reveal gross expenditures, by even broad classes, and some assumptions had to be made by the bureau of accounts to produce the gross expenditure figures shown in the above tabulation.

b. Unit Cost Data: No unit cost figures whatever, for street cleaning operations, are available, and because the equipment and material expenses are not distributed and because the reporting units of work are unsatisfactory, no valid unit costs could be obtained or computed during this study. It is believed that an activity classification for accounting for street cleaning expense should be adopted as a basis for a cost system. The establishment of new units for reporting work performed has been proposed in another part of this report.

c. Budget Estimates: It is believed that budget estimates are not prepared realistically, and that the bureau is penalized through its inability to develop proper justifications for its requests. The bureau estimates it needs 8 flushers, 6 motor sweepers, and 8 trucks for replacement and addition, and 43 new laborer and 17 new chauffeur positions. The budget requests as prepared for the current year, however, included estimates for 6 flushers, 5 trucks, 2 motor sweepers, and 43 new laborer and 7 new chauffeur positions.

It is believed that the budget for street cleaning work should be prepared on a work program basis and include all anticipated work including that for the state highway department. It is recommended that consideration be given to changing the accounting methods for state reimbursements so that expenditures for the estimated work will be included in the budget and the receipts will be paid into the general fund rather than deducted from street cleaning expenditures.

d. Trend of Expenditures: It is believed that street cleaning expenditures should generally decrease over the next few years and that personal services expenditures should decrease at a rather rapid rate. If anti-littering education and parking restrictions are made effective, the reductions should be very marked, but even if little can be achieved in these matters, continued efforts should be made to mechanize cleaning operations wherever possible, and thus to decrease personal service requirements. It is recommended that attention be given to possibilities for increasing the mechanization of street cleaning operations. Prominent among these possibilities is the procurement of machines to pick up cleanly the small piles of dirt now left by gang sweepers. If the machine sweeper piles can also be picked up mechanically, further substantial savings can be realized. Further savings can be made by finding locations in which as much as a month's accumulation of machine sweeper piles may be stored before being carried to the dump.

CHAPTER VIII

SEWER MAINTENANCE

1. Introduction

The bureau of sewer repair is one of the four bureaus of the department of public works that perform the principal maintenance and operational functions of the department. Prior to January 8, 1900, sewere construction and repair was under the direction of the superintendent of public streets, highways, and squares. A new charter effective on that date placed the function of construction of sewers in the bureau of engineering and the repair and cleaning of sewers in a bureau of streets in a newly created board of public works. In 1908, sewer cleaning and repair responsibilities were placed in the present bureau of sewer repair and the functions have remained substantially the same since that time.

On August 15, 1951, there were 132 employes in the bureau. The total expenditures of the bureau for the fiscal year 1950-1951 were $837,968 which included $140,582 for side sewer operations, which was reimbursed by the property owners for whom the side sewer work was performed. Therefore, the net expenditure of budgeted funds for the year was $697,836. The total budget appropriation for the fiscal year 1951-1952 is $823,383, of which $100,000 is set up as a revolving fund for side sewer repairs and installations, making the net appropriation $723,383.

One of the major problems in the bureau appears to be a lack of adequate supervision. Some of the activities of the bureau are without heads and must rely for supervision on division heads who cannot devote sufficient time to provide positive direction.

The effect of faulty early sewer design on the maintenance of the sewers is considerable. The resulting problems are being slowly alleviated by a gradual replacement of obsolete or otherwise unsatisfactory sewers with those of a modern and functional design. The problem of subsidence seems to affect

side sewer installations more than main sewer construction. Main sewers are generally built on piles and are not affected by subsidence to any serious extent.

2. Functions and Activities

The bureau of sewer repair is responsible for the maintenance and repair of 779 miles of sewers which comprise the combined sewage collection system for the City and County of San Francisco. The responsibilities of the bureau include the cleaning and repairing of sewers, the construction and repairing of manholes, the cleaning and repairing of catch basins, and the operation and maintenance of 12 sewage pumping stations. The specific functions and activities of the bureau may be stated as follows:

a. Repairing all breaks and leaks in the main sewers of vitrified clay pipe and concrete pipe construction by replacing defective sections.

b. Repairing defective sections of the main sewers of brick construction by removing and replacing the sections with new brick.

c. Repairing all breaks and leaks in the side sewers that occur between the sidewalk trap and the main sewer, for which the property owners concerned pay the entire cost.

d. Installing side sewers for new buildings, the cost being reimbursed by the property owners concerned.

e. Constructing new manholes on existing sewers in locations where such manholes are considered to be necessary.

f. Repairing existing manholes, catch basins, and other sewer system appurtenances.

g. Constructing new catch basins and connecting them to existing main sewers.

h. Cleaning approximately 25,000 catch basins by the use of eductor equipment supplemented, when necessary, by manual methods.

i. Cleaning the flatter sections of the main sewers using motorized bucket and windlass equipment or, under special circumstances, hand methods.

j. Cleaning main sewers and displacing obstructions in them by flushing with water.

k. Detecting the location of breaks and leaks by flushing dye through the sewer system or through surface breaks.

l. Repairing the force mains carrying the pumped sewage into the treatment plants, the interceptor system collecting the sewage for discharge into the treatment plants, and the outfall sewers discharging the sewage flow into the bay.

3. Description of Sewer System

The sewer system of the city consists of 778.9 miles of combined sewers. The several types of sewer, the minimum and maximum size of each type, and the number of miles of each type are shown in the following tabulation:

Type	Size	Miles of Sewer
Vitrified clay pipe	6" - 24"	590.0
Cement pipe	12" - 16"	5.4
Cast iron pipe	10" - 24"	2.0
Brick	12" - 7'x8'6"	76.0
Steel pipe in concrete	10" - 30"	1.0
Reinforced concrete	2'x3' - 8'3"x9'6"	91.0
Spun reinforced concrete	27" - 7'6"	6.7
Transite	12" - 18"	6.8
Total		778.9

There are approximately 25,000 catch basins and an unknown number of manholes. The bureau also operates 12 sewage pumping stations.

Some dry weather sewage flow is now being discharged into the bay. However, upon the completion of the new treatment plants in the very near future all dry weather flow will be passed and treated through the treatment plants and none will be discharged into the bay.

According to the terminology in use, main sewers are any sewers located longitudinally and include trunk and feeder mains. Side sewers are the house connections leading from the property to the main sewer. Side sewers are part of the property to which they are connected and the owner is responsible for their maintenance although the city makes all repairs on that portion of the side sewer leading from the sidewalk trap to the main sewer at a cost reimbursable by the property owner. Repairs on that portion of the side sewer leading from the property to the sidewalk trap are made by plumbers by individual arrangements with the property owner.

4. Organization and Staff

a. Present Organization Structure: The bureau of sewer repair is headed by a superintendent of sewer repair, a civil service employe, who is appointed by and responsible to the assistant director of public works in charge of operation and maintenance. As of August 15, 1951, the internal organization of the bureau, the number of positions assigned to each unit, and the annual payroll cost for each are shown in the tabulation that follows (descending lines of authority are shown by indentations of the names of the units):

Name of Unit	Title of Head of Unit	Number of Positions	Annual Payroll Cost
Bureau of sewer repair	Superintendent, bureau of sewer repair	1	$ 9,600.00
Side sewer division	Assistant superintendent, bureau of sewer repair	1	6,720.00
Side sewer repair	General foreman, sewer connection and repairs	24	96,280.00
Sewage pumping stations	Assistant engineer I, electrical	8	33,924.00
Main sewer division	Assistant superintendent, bureau of sewer repair	1	6,720.00
Brick repairs unit	a/	17	97,150.00
Sewer cleaning unit	Sewer cleaner	3	11,950.00
Sewer cleaning unit	Sewer cleaner	3	11,950.00
Sewer cleaning unit	Sewer cleaner	3	11,950.00
Sewer cleaning unit	Sewer cleaner	3	11,950.00
Sewer cleaning unit	Sewer cleaner	3	11,950.00
Sewer cleaning unit	Sewer cleaner	3	11,950.00
Laborer	Laborer	1	3,400.00
Main sewer repair	General foreman, sewer connections and repairs	21	83,640.00
Catch basin cleaning and miscellaneous services	General foreman, sewer connections and repairs	40	153,615.00
Totals		132	$566,149.00

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a/ No designated head of unit; the six bricklayers report directly to the assistant superintendent, bureau of sewer repair, and generally each bricklayer has two hodcarriers under his supervision.

No official designations have been established for the internal organization units, but the names used in the above tabulation are those in common usage.

Although the organization chart submitted by the bureau shows the brick repair unit as being under the side sewer division, the unit works almost exclusively for main sewer repair in the main sewer division and supervision over the six bricklayers is exercised by the general foreman, sewer connections and repairs, who is in charge of the main sewer repair unit. The brick repair unit, therefore, is shown under the main sewer division in the above tabulation.

b. Present Staff: The staff of the bureau and the pay rates of the several positions as of August 15, 1951 are shown in the tabulation that follows (descending lines of authority are shown by indentations of position titles):

Position	Number of Positions	Rate of Pay		Annual Payroll Cost
		Daily	Monthly	
Superintendent, bureau of sewer repair	1		$800.00	$ 9,600.00
Assistant superintendent, bureau of sewer repair	1		560.00	6,720.00
General foreman, sewer connections and repairs	1		470.00	5,640.00
Chauffeur	1	$19.36		4,840.00
Cribber	22	15.60		85,800.00
Assistant engineer I, electrical	1		465.00	5,580.00
Operating engineer	1		402.00	4,824.00
Operating engineer	1		380.00	4,560.00
Junior operating engineer	3		340.00	12,240.00
Junior operating engineer	2		280.00	6,720.00
Assistant superintendent, bureau of sewer repair	1		560.00	6,720.00
Bricklayer	6	27.00		40,500.00
Hodcarrier	11	20.60		55,650.00
Sewer cleaner	1	17.10		4,275.00
Sewer cleaner	1	17.10		4,275.00
Laborer	1	13.60		3,400.00
Sewer cleaner	1	17.10		4,275.00
Sewer cleaner	1	17.10		4,275.00
Laborer	1	13.60		3,400.00
Sewer cleaner	1	17.10		4,275.00
Sewer cleaner	1	17.10		4,275.00
Laborer	1	13.60		3,400.00
Sewer cleaner	1	17.10		4,275.00
Sewer cleaner	1	17.10		4,275.00
Laborer	1	13.60		3,400.00

Position	Number of Positions	Rate of Pay Daily	Rate of Pay Monthly	Annual Payroll Cost
Sewer cleaner	1	$17.10		$ 4,275.00
Sewer cleaner	1	17.10		4,275.00
Laborer	1	13.60		3,400.00
Sewer cleaner	1	17.10		4,275.00
Sewer cleaner	1	17.10		4,275.00
Laborer	1	13.60		3,400.00
Laborer	1	13.60		3,400.00
General foreman, sewer connections and repairs	1		$470.00	5,640.00
Cribber	20	15.60		78,000.00
General foreman, sewer connections and repairs	1		470.00	5,640.00
Chauffeur	10	19.36		48,400.00
Sewer cleaner	5	17.10		21,375.00
Laborer	24	13.60		81,600.00
Totals	132			$566,149.00

In addition to the above positions the bureau has assigned to it a junior civil engineer from the bureau of engineering and a general clerk-typist from the bureau of accounts.

5. Comments on the Present Organization and Staff

a. Equalization of Supervisory Workload: The number of units in each of the two divisions under the present plan of organization throws a disproportionate burden of responsibility on the main sewer division. The side sewer division consists of a side sewer repair unit and a sewage pumping station unit. All other units of the bureau are in the main sewer division. There are 41 employes in the side sewer division and 92 employes in the main sewer division. There should be a more equitable distribution of divisional workload so that each division can be properly supervised and controlled.

Probably the most logical distribution of activities would be one made on the basis of the character of the bureau's operations, that is, maintenance and operation. It would appear that the main sewer repair unit, the side sewer repair unit, and the brick repair unit should form one division due to the great similarity of the work. Such a division might be called the sewer construction and repair division.

The remainder of the activities in the bureau are operational in nature and, therefore, could be formed into a second division to be called the sewer operation division. This division would consist of the sewage pumping station unit, the catch basin cleaning units, the sewer cleaning units, and the miscellaneous services units. The proposed division of duties would provide a more equitable distribution of workload, and a much more logical arrangement than now exists.

It is, therefore, recommended that the present activities be regrouped so that the bricklaying, the main sewer repairing, and the side sewer repairing are placed in a sewer construction and repair division, and the catch basin cleaning, the sewer cleaning, the sewage pumping operating, and miscellaneous services activities (called special services in the proposed organization) are allocated to a sewer operation division.

b. Span of Control for Main Sewer Division: The head of the main sewer division has 13 crews and two general foreman reporting to him. The number of units is too great for him to handle adequately and to supervise properly. He is required to supervise directly the six sewer cleaning crews, six brick sewer repair crews, and one labor crew, and it is not good practice to have an assistant superintendent acting as a general foreman for sewer cleaning crews. In reality, he spends so much time on detailed supervisory work that he does not have time to do the more important job of directing the two large units or dealing adequately with other administrative duties. The situation would be essentially the same under the proposed reallocation of activities as under the present arrangement. It is believed that the sewer cleaning operation should be under the direct supervision of a foreman who can devote his time exclusively to the field operations of this unit, and conduct some intensive research into new procedures and methods.

To place the sewer cleaning operation under a foreman would reduce the number of units reporting directly to the division head by six. This should enable the division head to exercise the kind of control that is necessary for the efficient and economical operation of the division. It is, therefore, recommended that the sewer cleaning operation be placed under the supervision of a foreman directly responsible to the division head.

c. Head for Brick Paving Unit: The authorized brick sewer repair force consists of seven bricklayers and 12 hodcarriers, although one position of bricklayer and one of hodcarrier are now vacant. The salaries of these 19 authorized positions represents an annual expenditure of $109,050; and, of the 17 actual employes, $97,150. To achieve even reasonable efficiency it is essential that a force of such size requiring a comparatively large expenditure of money should have a designated head to exercise immediate supervisory control over its activities. Under present conditions, the span of control is extended beyond satisfactory working limits. It is not fair either to the employes nor to the officials of the bureau to allow this situation to continue. Furthermore, strengthening the supervision would certainly produce a net saving to the city, either in a reduction of the working force or in an increase in the production of the present employes. It is therefore recommended that a bricklayer foreman position be created to head the brick repair unit and to be responsible directly to the head of the proposed sewer construction and repair division.

d. Miscellaneous Services: The miscellaneous services (called special services in the proposed organization) consist of flushing, following up complaints, detecting sewer breaks, and trouble shooting in general. This unit is under the supervision of the general foreman who is also responsible for catch basin cleaning. There is no close relationship between catch basin cleaning and performing the above mentioned services. In order to permit the present general foreman to exercise closer supervision over catch basin cleaning and to provide for closer surveillance over the work of the miscellaneous services unit, it is recommended that the general foreman supervise the 10 eductor crews, and that a new foreman position be created and assigned to supervise the proposed special services unit and to report directly to the division head.

e. Office Services: The clerical services for the bureau of sewer repair are performed by a general clerk-typist who is assigned to this duty from the bureau of accounts. Other office services, including the maintaining of maps and records for the bureau of sewer repair, are performed by a junior civil engineer assigned from the bureau of engineering on a part-time basis.

In addition to maintaining the maps and records for the bureau, the engineer is making a survey of all brick sewers in the city. Although the activities of the engineer are necessary as far as they have gone, the scope of his operations should be extended to include improving the record system, analyzing performance and cost data, and conducting investigations of methods and operations. There is a definite need in the bureau for the production of various types of analyses essential to a sound administration of the bureau. The bureau is fortunate to have available an engineer familiar with the bureau's operations and full advantage should be derived from this position by extending the duties and responsibilities to include supervision of the office services. It is recommended that this be done.

At present, the engineer spends approximately 85 percent of his time on work for the bureau of sewer repair. His remaining time is devoted to work on various phases of the sewerage system for the bureau of engineering. Although this division of time could remain the same, it is recommended that this position of junior civil engineer be assigned directly to the bureau of sewer repair, in view of the extent of work for that bureau. The position is now responsible for administrative and functional control to officials of the bureau of sewer repair.

6. Proposed Organization

Summarizing and giving effect to the recommendations contained in the preceding section, it is proposed that the organization plan of the bureau be revised as shown in the following tabulation:

Name of Unit	Title of Head of Unit
Bureau of sewer maintenance	Superintendent of sewer maintenance
Sewer operations division	Sewer operations supervisor
Sewer cleaning section	Sewer cleaning foreman
Catch basin cleaning section	Catch basin cleaning foreman
Special services section	Special services foreman
Sewage pumping section	Sewage pumping engineer
Sewer construction and repair division	Sewer repair supervisor
Main sewer repair section	Main sewer repair foreman
Side sewer repair section	Side sewer repair foreman
Brick sewer repair section	Bricklayer foreman
Office services division	Office engineer

It is not suggested that the above position titles need be adopted as civil service titles, but they should be used for administrative purposes for ease of identification. The proposed names of the organization units, or similar names that describe the divisions and sections, should be officially adopted by the director of public works.

The proposed plan provides a clear-cut division between the two principal functions of the bureau, namely, that of operation and of construction and repair. In the administration of these functions the plan provides a greater degree of flexibility than is now possible because similar skills and kinds of work are grouped in a single division. The proposed plan would eliminate the present divided authority and responsibility. This plan also would permit greatly improved field supervision by limiting the responsibilities of an assistant superintendent to those duties directly affecting only operations or only construction and repair.

The functions of most of the proposed organization units are indicated in a general way by the name of each unit and by the title of its head, but some further explanation may be desirable to show specifically the allocation of all principal functions. The sewer cleaning section would be allotted the work now done by the six sewer cleaning crews and one labor crew. The catch basin cleaning section would be assigned the duties now performed by the 10 eductor crews. The special services section would be given the functions of flushing sewers, investigating and dealing with complaints, detecting sewer breaks, and trouble shooting generally. The sewage pumping section would be allocated the operation and maintenance of the 12 sewage pumping stations.

The main sewer repair section would be given the function of repairing all pipe and all monolithic concrete main sewers. The brick sewer repair section would be made responsible for constructing and repairing manholes and catch basins, and for repairing main brick sewers. The side sewer repair section would be assigned the functions of installing and repairing the side sewers of the city. The office services division would be given the responsibility of maintaining

the sewer record maps up to date, analyzing performance and cost data, conducting investigations of methods and operations, and making surveys of sewers.

7. General Operating Procedures

a. General Comments: The methods used to carry out the responsibilities of the bureau were found to be generally satisfactory. Certain procedures relating to catch basin cleaning, transportation of sewer repair crews, and sewage pumping stations require some improvements to secure more effective and efficient operation. These and several other procedures are discussed in the following sections.

b. Adequacy of Catch Basin Cleaning: The operating records do not show the frequency of cleaning catch basins or reveal the number of complaints received of blocked or full basins. The summary records for the past three years, however, indicate that about half of the city's approximately 25,000 catch basins are cleaned each year. The summary figures are given in the following tabulation:

Year	Number of Catch Basins Cleaned	Cubic Yards of Silt Removed	Cubic Yards per Catch Basin
1948-1949	12,136	11,920	0.98
1949-1950	14,889	14,119	0.95
1950-1951	15,231	14,119	0.93

Actually, in the absence of frequency and complaint records, an appraisal of the cleaning work can be made only by testing the amount of dirt in basins and by observing the action during heavy rains. In the small sample observed during the field studies, most of the stoppages during rains appeared to result from blocked grates and openings rather than from overloaded catch basins. On the other hand, all basins tested contained large quantities of dirt and usually were from half to at least three-fourths full.

The frequency of cleaning may be satisfactory for conditions in San Francisco, but it appears to be somewhat less than that in comparable cities.

c. Use of Catch Basin Cleaning Summaries: The activities of eductor crews are summarized monthly in a report to the director of public works. The summaries of monthly reports for February 1951 through May 1951 are shown in the tabulation that follows:

Month	Catch Basins Cleaned		Hours on Sewer Wet Down	Hours on Pumping or Flushing	Hours on Repair
	Number	Hours			
February	1235	981	53	144	95
March	1375	1071	39	248	29
April	1387	1130	65	160	95
May	1699	1313	35	198	45
Average	1424	1124	48	188	66

The actual total number of hours worked by the eductor crews in the four months shown above is 5,886, whereas only 5,701 hours, or 97 percent, are accounted for in the summaries. A total of 185 working hours of eductor crews for the four months was not accounted for. The value of reports of this type lies in their completeness and accuracy. To make an analysis of operations on the basis of incomplete data is, of course, without validity and is certainly misleading. It is therefore recommended that summaries of catch basin cleaning operations be compiled accurately and show the activities of the eductor units for every hour worked or used.

It appears that the summaries of catch basin cleaning activities are not being used by bureau management to analyze the operations. A casual reading of the monthly summaries as they are now prepared does not provide significant information for unit performance analysis or for comparative purposes. A good summary of operations should show the exact time spent on each activity, the units of work performed for each hour of operation, and a comparison of performance among the crews. This type of information is required to make an effective analysis of operations. Such analyses, of course, should be made by the bureau in order to make those appraisals of operations which are essential to good management. It is therefore recommended that monthly summaries of catch basin cleaning operations be developed to show unit performance of each activity by each crew and that the summaries be used by bureau officials to analyze and appraise each activity.

d. Uneconomical Use of Eductors: The eductors are diverted from their primary and intended work of cleaning catch basins in order to wet backfilled sewer trenches, to flush sewers, or to do special pumping work. It may be seen from the above tabulation that an average of 236 hours a month of eductor use is so diverted, which means that, on the average, one and a half eductors are always in use for tasks other than cleaning catch basins.

The eductors are designed especially for cleaning catch basins, and are generally considered to be the most economical equipment for this work. Nevertheless, the machines are relatively expensive to operate and their use for hauling water or for pumping water cannot be justified. These special jobs can be performed by smaller crews with equipment that costs half as much to operate. A tank truck and driver can haul water satisfactorily and the cost would be about $3.75 an hour instead of about $8.10 an hour for an eductor crew. A pumping unit could be added to the tank truck so that the equipment could be used for power flushing or pumping water from basements.

It is reported that such misuse of equipment is necessary because requests for proper equipment are denied by budget authorities and the operating agencies have to make do with present equipment for any job that arises. For water hauling, however, the justification for providing the special tank truck is so strong that it is most unlikely that the acquisition would be denied. It would be possible, however, to transfer an old flusher from the bureau of street cleaning to this work if a new vehicle cannot be obtained.

Eductor crews try to follow a certain pattern for catch basin cleaning throughout their districts. Orders to perform miscellaneous services interrupt this pattern and a considerable amount of time is spent merely in driving from one

job to another. It is believed that, if eductor crews were permitted to work exclusively on catch basin cleaning, substantially more catch basins would be cleaned and a further reduction in eductor crews would be possible.

It is recommended that the city's eductors be used exclusively for catch basin cleaning except in case of actual emergencies, and that suitable equipment be acquired for pumping, flushing, and hauling water. It is further recommended that two eductor crews be eliminated and the two eductors be used strictly as spares for catch basin cleaning work. A driver would have to be provided for the tank truck, but, after providing for his wages and the tank truck cost, there would be a saving of at least $25,000 a year over present costs.

e. Comparative Cost of Catch Basin Cleaning: In order to analyze and measure the catch basin cleaning work of the various crews, the monthly summary of operations for the month of April 1951 was chosen at random for the purpose of making the computations which are shown in the following tabulation:

		Catch Basins Cleaned			Cost of Operation				
Eductor No.	Chauffeur	No.	Hours	Min. per C/Basin	Wage Cost	Overhead Cost	Equipment Cost	Total Cost	Cost per Catbh Basin
401	J. Brennan E. Meagles	155	127	49	$ 5,913	$ 1,498	$ 191	$ 7,602	$49
402	R. Benson	117	103	53	4,796	1,215	155	6,166	52
403	J. Kelly	109	100	55	4,656	1,180	150	5,986	55
404	G. Johnson	127	100.5	47	4,679	1,185	151	6,015	47
405	T. McHugh	146	125.5	52	5,843	1,480	188	7,511	51
406	E. Meagles	122	101	50	4,703	1,191	151	6,045	50
408	R. Benson	48	40	50	1,862	472	60	2,394	50
414	J. Segale	206	158	46	7,356	1,864	237	9,457	46
415	J. Conway	198	150	46	6,984	1,770	225	8,979	45
419	A. Brady	128	99.5	47	4,633	1,174	149	5,956	47
420	J. Brennan	31	26	50	1,211	307	39	1,557	50
Totals		1,387	1,130.5	49	$52,636	$13,336	$1,696	$67,668	$49

The unit costs of cleaning catch basins, listed above, show only a very slight variation among crews. This is the result of the surprising similarity of unit production for each eductor crew. The number of minutes required to clean one catch basin varies from 46 to 55 with an average of 49, or about 10 catch basins per day. In view of the many geographical and other factors affecting catch basin cleaning, a greater variance would be expected as between the districts. The figures suggest that perhaps the eductor crews have adopted an unofficial standard of cleaning 10 catch basins per day. This standard is extremely low compared with the experiences of other cities, and judged by the review of catch basin cleaning operations undertaken as a part of this study.

Observation of the catch basin cleaning operations revealed that catch basins can normally be cleaned in from 10 to 30 minutes, depending on the accumulation of dirt in the basins. The timed cleaning of one catch basin which was solidly full of dirt was seven minutes. On the average, then, an eductor crew should be able to clean from 16 to 20 catch basins a day without any difficulty,

and even higher rates of cleaning are experienced in some comparable cities. The high cost of catch basin cleaning indicates a need to improve the present standard. An improved production standard can be achieved primarily by the exercise of more diligent supervision. It is proposed elsewhere in the report that the special services presently under the same supervision as catch basin cleaning be formed into a separate unit. It is believed that, if the supervisor of catch basin cleaning spends his time exclusively with that unit, the constant and positive supervision resulting will decrease unit costs considerably.

It is recommended that time studies be made of the operations of the several crews as a basis for the improvement of practices and the establishment of reasonable standards of performance.

f. Three-Man Operation of Eductors: An eductor crew in San Francisco consists of three men, a chauffeur, and two laborers. The chauffeur drives the eductor to the cleaning route and, after each basin is cleaned, drives to the next one; and, of course, during the driving periods the laborers can do no work. When an eductor reaches a catch basin, the two laborers operate the eductor machinery and clean the basin, and during this time the chauffeur does nothing. A chauffeur may work no more than one hour during a day of catch basin cleaning.

The work of cleaning catch basins is a two-man operation and is done with two-man crews throughout the country. The driver is normally in charge of a crew and operates the eductor machinery in addition to driving, and a laborer puts the hoses in the basin, removes objects that cannot be pumped, and assists in other ways. It is understood that such a two-man operation is not possible under present union agreements, even though the drivers of several other kinds of special equipment normally do other work for which the equipment is designed. It would seem that an acceptable plan of operation that would be acceptable to everyone concerned could be worked out and the cost of the operation of a crew thereby reduced from $8.10 to $6.00 an hour, or, for eight eductors, a total saving of $33,600 a year might be made.

It might be practicable to classify the eductor operator position in a separate category to take into account both driver and eductor work to compensate the employes for the extra work.

It is recommended that efforts be made to have two-man operation of eductors accepted by those concerned.

g. Scheduling Catch Basin Cleaning Operations: One of the best means of programming and controlling catch basin cleaning work is the adoption of a positive record system which shows the location of each basin and the date of each cleaning. Usually such records are kept on cards, each of which shows the number and location of a single catch basin and has columns for recording the date of cleaning and the estimated quantity of dirt removed. A three by five inch card will serve to record the data for many years' work.

Sometimes the catch basins are numbered in succession along north and south streets, but some cities establish catch basin cleaning routes and number the basins in sequence along each route. The latter method provides an easier means of control and scheduling because it is necessary to deal only with routes rather than individual basins.

In 1949 the bureau of sewer repair began to formulate a system of records designed to record catch basin cleaning data for control, scheduling, and appraisal purposes, but it was abandoned before it was completed because of the lack of adequate clerical help.

It is recommended that a simple system of controlling and scheduling catch basin cleaning work be developed and installed; that, as a part thereof, each basin be numbered in some logical manner and located by streets; and that each cleaning be recorded by date. It will be necessary to provide assistance to secure the data on location and to prepare the cards, and such help should be made available. Once this system is established, however, only a few minutes' time will be necessary each day to make the simple entries by date stamp.

It is further recommended that catch basin cleaning routes be established as a means of assigning and scheduling the work.

h. Supervision of Catch Basin Cleaning: The supervision of catch basin cleaning work is less positive and less extensive than is needed to ensure effective conduct of the operations. It is believed that concentrated supervision supplemented by some inquiry into methods and practices will produce a substantial increase in production. It appears that much of the supervision at the present time is at the field office.

Catch basin cleaning crews report at 8:00 a.m. to the office where they pick up their orders for the day and leave immediately for their districts. As of October 3, 1951, the crews are instructed not to arrive at the dump prior to 4:45 p.m. which allows sufficient time to dump the load and report to the office at 5:00 p.m. This is made possible because the new location of the office is relatively close to the dump locations. Prior to this change in instructions the crews were instructed not to arrive at the dump prior to 4:15 p.m. However, it was observed that some eductors arrived much earlier than stipulated under both arrangements. The dump attendants report the time of arrival and departure of all eductors and the reports are available to the supervisory staff of the bureau. It was reported that these data are now being reviewed by operating officials to enforce the regulation of dumping time. This review should continue in order to minimize the time lost by eductors which arrive at the dumps too early, but, of course, this is only one check on the activities of the crews. In reality, it is the time at which the crews leave their routes that is of most significance, and this can be controlled only by positive field supervision.

Eductor crews are instructed to telephone the office at 1:00 p.m. daily to get additional orders for special duties or complaints that were reported during the morning. However, two eductor crews regularly report to the office at noon after having made a dump. This is done to receive any complaints which may require special attention. There appears to be little reason for having these two crews report to the office since they could receive information over the telephone as do the other crews, and thus save a trip to the office. It is therefore recommended that all eductor crews be required to remain in the field on or near their routes and to receive special orders by telephone.

It has been proposed in another part of this chapter that the catch basin cleaning work be placed in a separate section and be supervised by a catch

basin cleaning foreman. This employe should spend almost full time in the field observing activities, instructing the workers, and improving practices. By judicious arrangement of routes, the crews can do all work in a particular district of the city on any one day. It is recommended that the work of catch basin cleaning be closely supervised by the foreman, and that a new routing plan be developed so that the crews all work in the same section of the city on any particular day.

The possibility of developing some device which would permit the examination of catch basins to determine the amount of solids prior to the arrival of the eductor crews should be examined. Catch basins not ready for cleaning could be so marked and the eductor crew would skip those and go to the next one.

i. Field Reporting of Catch Basin Cleaning: Eductor crews prepare daily reports showing the location and time of each activity. A review of these reports indicates a lack of uniformity in recording the information on operations. The fault appears to be due in part to the use of a form not designed to report this type of activity. The provision of a form especially designed to fit the reporting needs of the catch basin cleaning work would provide more accurate and uniform information. A part of the difficulty, however, arises from the failure of the supervisors to review the reports regularly and to call attention to omissions or improperly recorded information. If the reports were regularly analyzed and summarized, the defects would immediately be revealed.

It is recommended that a suitable form be provided for reporting the operations of the eductor crews, and that the reports be reviewed daily for completeness and accuracy by the supervisor of the work.

j. Transportation for Main Sewer Repair Crews: The general foreman for main sewer repair sees each of his nine crews twice daily. He inspects the progress of the work and arranges for deliveries of materials required on the job and schedules the transportation of the crews and equipment from one job to another. The general foreman also schedules the transportation of the six bricklaying crews who work on main sewer repair. To transport crews, materials, and equipment for the main sewer and side sewer operations, four one-and-a-half ton dump trucks are regularly assigned to the main sewer repair unit and another truck of the same size is placed at the disposal of the main sewer repair unit by the side sewer repair unit. The five trucks are pooled to provide the transportation needs of both units.

During the field work undertaken as a part of this study, it was observed in numerous instances that main sewer repair crews were standing idle waiting for transporation, or were waiting for bricklaying crews to arrive, or bricklaying crews were waiting for transportation. More frequent delays of the bricklaying crews were noted, probably because the bricklaying crews are required to move from one job to another more often than the repair crews. Procedures which cause city employes to remain idle for considerable lengths of time generally incur justifiable criticism from the public and certainly do not conform with sound business management principles.

Information is not available as to the amount of time lost by bricklaying crews and cribbing crews due to transportation delays, but a conservative estimate

of the loss has been developed on the basis of field observations and information obtained from the bureau officials.

The average amount of time lost by bricklaying and cribbing crews, due to delays of transportation, is about one hour a day for each crew, or approximately 250 hours annually. On the basis of the wages of two bricklayers (top men) and four hodcarriers, the loss of time represents $4,200 annually for the bricklaying crews. The loss of time of the cribbing crews represents $975 in wages for each cribbing crew. In order to eliminate such losses it is essential, first, that the two top bricklaying crews be kept productively occupied to the greatest extent practicable, and, second, that adequate arrangements are made for the prompt transportation of the cribbing crews.

To achieve maximum productivity the two top bricklaying crews should be provided with pickup trucks designed to accommodate relatively large tool boxes and a minimum amount of materials. These pickup trucks should be equipped with special tools, such as pipe saws, to increase productivity. Mobile bricklaying crews would be able to minimize delays on main sewer repair jobs, and would release dump trucks for the exclusive use of the sewer repair crews, thus making it possible to eliminate delay for those crews. Mobile bricklaying crews could also do odd jobs, such as replacing catch basins, whenever they are not needed to serve the sewer repair crews. The bureau of street repair has provided its bricklaying crew with a pickup truck and reports a considerable increase in the output of the crew.

It is therefore recommended that the bureau provide pickup trucks for the two top bricklaying crews. It is further recommended that the present position vacancies of one bricklayer and one hodcarrier not be filled and the positions be eliminated, because more productive use of the top bricklaying crews should make them unnecessary.

k. Transportation for Side Sewer Repair Crews: Some delays due to inadequate transportation of side sewer repair crews were noted during the field studies. After the completion of a job the crews must, of necessity, wait for the trucks to provide their transportation.

Since property owners pay the actual cost of installing and repairing side sewers, any indication of inactivity or loafing on the part of the crews naturally arouses criticism. The bureau has been conscious of the need to reduce these delays to a minimum, not only to curtail public criticism, but to promote internal efficiency as well. By agreement between the main sewer repair foreman and the side sewer repair foreman the transportation requirements of side sewer repair crews now have priority over other requirements. In most cases this arrangement seems to be working satisfactorily insofar as preventing serious delays to the crews, but it is not at all clear that it secures the most effective or the most economical use of the equipment. It is suggested that a study be made of the equipment needs of the side sewer crews and a cost comparison be made of several possible arrangements, including (1) furnishing each side sewer crew with a small truck designed and proportioned to fit the operation, (2) providing a rented truck for each crew, and (3) utilizing the present plan. It is recommended that such a cost analysis be made by the bureau or the department.

l. Working Hours of Sewer Repair Crews: The working hours of the sewer repair crews, including the truck chauffeurs, are from 8:00 a.m. to 5:00 p.m. with one hour for lunch. In order that the trucks can finish a day's work

by 5:00 p.m., the crews are now required to finish their work by about 4:00 p.m. to allow excavated material to be cleaned up and loaded on the trucks. The material has to be collected and ready for the trucks as they make the rounds. During the hour between 4:00 p.m. and 5:00 p.m. there is little for the crews to do except wait until 5:00 p.m., the official quitting time. It has been reported that some of the men have occasionally left before 5:00 p.m. and have received disciplinary layoffs for so doing. Procedures which regularly allow men to remain idle for one hour at the end of a working day create a considerable problem of supervisory control which could be removed by a change of procedures.

If the cleaning-up operations could be deferred until 4:30 p.m., a half hour could be saved for each crew. The wage cost of one-half hour of work for 10 main sewer repair crews and 10 side sewer repair crews, the normal strength of both units, is $39.00. The trucks that collect the cleanup material would have to work in the field right up to five o'clock before they leave for dumping and return to the garage. Therefore, if the trucks could be scheduled to start one-half hour later each morning and quit one-half hour later each night, the entire $39.00 a day, or $9,750 a year, could be saved.

To require sewer repair crews to work until 5:00 p.m. would result in increased productivity and would eliminate public criticism now directed at the repair crews standing around idle, a situation over which the crews have no control. It is therefore recommended that the main sewer and the side sewer repair crews be required to work until at least 4:30 p.m. before starting to clean up and that the trucks be required to report and stop work one-half hour later each day than the sewer crews.

m. Sewer Cleaning Records: The cost of sewer cleaning, the number of sewers cleaned, and the cubic yards of silt removed, for the fiscal years 1948-1949 through 1950-1951 are shown in the following tabulation:

	Number of Sewers Cleaned	Cubic Yards of Silt Removed	Cost of Sewer Cleaning		
			Motor Equipment	Hand Power	Total
1948-1949	a/	2099	a/	a/	$80,884
1949-1950	166	2355	$79,123	$8,955	88,078
1950-1951	198	2542	90,495	529	91,024

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a/ Figures not available.

A monthly summary of operations for sewer cleaning is prepared by the bureau of accounts. The report gives all locations of sewer cleaning crews during the month, the total amount of cubic yards of silt removed, and the cost of labor, trucks, and materials for the month. Annual reports are subsequently compiled from the monthly reports giving the information shown in the above tabulation.

The type of information prepared by the bureau of accounts has little analytical or comparative value. One of the purposes of a report is to allow management to analyze an activity for cost and production units for individual crews. A monthly report should summarize the work done and should show, for each crew, the cost per mile, or per lineal foot, of cleaning each size of sewer. The basic information can be provided by each sewer cleaning crew through a daily report designed to record the required information in as simple a manner as possible.

It is recommended that monthly reports of sewer cleaning operations be developed to show unit cost and production information and that they be submitted to bureau officials as soon as practicable after the end of each month.

n. Gas Detection in Sewers: Many cities have recognized the importance of a gas detection program in their sewer systems, and have taken measures to prevent explosions and to protect the sewer employes. Unhappily, many of these cities have adopted control measures only after a fatal tragedy to sewer personnel as a result of dangerous sewer gases. In order to ensure the safety of the crews working below surface, it is recommended that a gas detection program be instituted and carried out in San Francisco. Such a program should include periodic surveys of the sewers for gas detection, the instruction of employes in the use of protective equipment, and the use of ventilating equipment when necessary.

During the field work for this report several of the men were asked whether they knew how to use the gas masks which are provided for every crew and carried in their vehicles. None admitted knowing how to use the mask and all expressed distrust of the gas mask. As a part of the proposed gas detection program, the men should be trained in the proper care and use of the gas mask. This type of training can be successful, as can be testified by many who were recently in the armed forces. The success of the training will depend primarily on the interest shown by management in making available carefully planned and frequent drills in the use of the gas mask.

o. Sewage Pumping Operations: The responsibility for the maintenance of 12 sewage pumping stations was transferred from the bureau of engineering to the bureau of sewer repair on April 1, 1950. The size of each district, the population of the district served by each pumping station, and the extent of pumping operations during the fiscal year 1950-1951 are shown in the following tabulation:

Station	Contributing Population	Size in Acres of District Served	Pumpage in Million Gallons Total for Year	Daily Average
Marina	63,000	1,125.0	2175.40	5.960
Commercial Street	14,000	92.5	275.01	.750
Sea Cliff No. 1	50	4.0	.73	.002
Sea Cliff No. 2	2,400	83.4	57.12	.156
Park Merced	7,500	212.0	143.13	.391
Vicente	2,100	51.4	49.16	.138
Fitzgerald	800	30.0	36.91	.101
Pine Lake	136	3.0	2.42	.007
Hyde Street	a/	14.0	5.15	.014
Fulton Street	1,300	82.0	35.88	.098
Lakeshore	b/	b/	b/	b/
LaPlace	c/	c/	c/	c/

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a/ Station serves commercial and industrial area with no population figure available.

b/ Station constructed during the fiscal year and no accurate record of operation has been compiled.

c/ No record of operation available.

The stations are located in low areas of the city which cannot be drained by gravity into main sewers. Stations are generally designed for capacities sufficient to handle all sanitary sewage and, in addition, to take care of a maximum storm run-off of .02 inches per hour. With the exception of Commercial Street, all stations are provided with overflow spillways so that run-off beyond the capacity of the station is discharged directly into the ocean or bay.

Four of the stations have regularly assigned operators for maintenance purposes. The Marina and Commercial Street stations each have two operators, one on an 8:00 a.m. to 4:00 p.m. shift and one on the 4:00 p.m. to 12:00 a.m. shift daily, and one operator on Saturdays and Sundays from 10:00 a.m. to 6:00 p.m. The Park Merced and Sea Cliff No. 2 stations each have one operator on an 8:00 a.m. to 4:00 p.m. shift six days a week and on the seventh day the electrical engineer checks operations at these stations. In addition, there is one operator who works as a relief operating engineer and who performs the maintenance work on the eight pumping stations which do not have regularly assigned personnel.

p. Two-Shift Operation of the Marina and Commercial Street Stations: It is reported that the Marina and Commercial Street stations have two operators assigned to them because of the amount of maintenance necessary, and because a mechanical failure during the daylight hours would inconvenience a large proportion of the city's population. These stations are larger than the others and presumably the amount of mechanical and janitorial maintenance is greater. It is questionable, however, whether there is sufficient maintenance work to keep an operator

busy for more than eight hours a day regularly. For maintenance purposes, therefore, it is believed that one operator would be adequate at each of the above-mentioned stations.

It is doubtful if a mechanical failure in the Marina station would inconvenience the district. The station is completely automatic and provided with a spillway. In the event of failure at this station, the sewage would automatically empty into the bay until such a time as the station could be put back into operation. The presence of an operator would undoubtedly hasten the repair of the failure but no inconvenience to the population would result by postponing the repair for a few hours. In fact, the population would be unaware of any failure at the pumping station. It is therefore recommended that an operator be assigned to the Marina station for one shift a day, seven days a week, and that a position of operating engineer previously assigned to the second shift be eliminated at that station.

The Commercial Street station is not provided with a spillway and sewage cannot be by-passed or the station shut down if the power failed and the electric equipment were inoperative. A gasoline-driven pump is available in order to prevent flooding of the area at lower Market Street. Should a power failure occur during a rainstorm at night when there is no operator on duty, there would be no way of preventing the flooding of the area. Arrangements are made with a nearby firehouse to notify personnel of the pumping station in case of such an emergency, but it is felt that it would take too long for the operator to get to the station to prevent serious damage. Although such an emergency has not yet arisen, it might well do so at any time, and the advisability of building a new fully-automatic station with modern equipment for meeting all emergencies should be seriously considered. In the meantime, operators should be assigned to this station on a 24-hour a day basis, seven days a week.

It is recommended that a new, well-equipped, pumping station be built to replace the one presently located on Commercial Street. It is further recommended that operators be assigned to the Commercial Street station on a 24-hour a day basis, seven days a week. The additional operator required for the proposed third shift could be taken from the Marina station.

q. <u>Operation of the Park Merced and Sea Cliff No. 2 Stations</u>: The Park Merced and Sea Cliff No. 2 stations are fully automatic and provided with spillways. In the event of failure at these stations the sewage is automatically by-passed into a spillway. An operator is assigned to each of these stations six days a week and the engineer in charge of the pumping stations checks the above-mentioned stations on the seventh day. It is reported that operators are regularly assigned to the two stations for maintenance and standby purposes and not for operating purposes. The amount of maintenance at either of these stations does not justify the assignment of full-time operators. One operator could easily perform the required maintenance for both these stations, in addition to helping out on other stations. The use of full-time personnel for standby purposes is not warranted in view of the automatic features of the two stations.

It is recommended that regular shifts at the Park Merced and Sea Cliff No. 2 stations be discontinued and that the necessary maintenance work be performed by one operator on a roving assignment covering several stations. It is further recommended that one position of junior operating engineer be eliminated.

r. Special Services: The special maintenance operations of the bureau are performed by five crews, each consisting of a sewer cleaner, a truck crew consisting of a rented 1-1/2 ton truck and driver, and one laborer. The five crews are known as flushing crews, primarily because they carry hose and sometimes flush sewers to relieve blocked or clogged conditions. However, the primary function of these crews is to investigate complaints and correct the trouble. All complaints are routed to these crews. Whenever they are able to alleviate or correct the trouble they do so, but, when the corrective work is properly the task of one of the other division of the bureau, the complaint is referred to that bureau for suitable action.

As each complaint is received it is registered in a journal and routed to a flushing crew. The disposition of each complaint is subsequently reported to the general foreman and recorded in the journal. A complaint of a type which, in the opinion of the general foreman, is serious or may perhaps lead to future trouble is recorded on a 3x5 card and the cards are filed by location for reference purposes. Bureau records show that the total number of complaints received and investigated by the bureau during the fiscal year 1948-1949 was 8953, 8451 for 1949-1950, and 6700 for 1950-1951. These figures, however, are only estimates made by counting pages and estimating the average number on a page, and are not the actual number of complaints. For purposes of analysis the report of the number of complaints should be accurate, and, actually, the information is of sufficient importance to report monthly. The considerable decrease in the number of complaints indicated by the reported figures would seem to demand some administrative analysis with a view to reducing flushing crews. The apparent decrease of 25 percent in volume of work is large enough to warrant a review and recount of the complaint ledger to determine the accuracy of the complaint count. If the decrease in the volume of work actually approximates 25 percent, then it is recommended that the number of flushing crews be reduced from five to four. It is also recommended that complaint counts be reported accurately each month. This can be very easily accomplished by maintaining a consecutive daily count of all complaints.

s. Stand-By Requirements for Supervisory Staff: The three general foremen in the bureau and the assistant superintendent in charge of the main sewer division are each subject to call after regular working hours on one week out of every four. A schedule is prepared and posted to show which one of the four supervisors is on call for each week. The night watchman is instructed to report to the supervisor on call any emergencies which may need immediate attention. When a supervisor is on call he is required to report his whereabouts to the watchman on duty so that he may be reached promptly by telephone.

The nature of emergency situations in the bureau is such that someone in authority must be continually available to handle them to ensure public safety. The practice of placing a supervisor on call during a designated period of time is a valid one. However, this requirement should be specifically stated as a regular duty of the position and should presumably be a factor in the determination of the salary for the position. The present reported policy of requiring certain of the supervisors to be on call regularly without proper cognizance of this requirement in the classification of their positions is believed to be unfair and should be remedied.

Under the proposed plan of organization, there will be five foremen who should be assigned in regular sequence to be on call for emergency duty for a week, thus relieving the assistant superintendent (or supervisors in the proposed plan) from regular assignment. Nevertheless, the supervisors should be subject to call by the foreman if an emergency cannot be properly dealt with by the foreman concerned.

It is recommended that the requirement to be on call regularly by the foremen of the bureau of sewer repair be specified as a requirement for the supervisory positions and that a reclassification of the positions be made on the basis of the additional duties. It is further recommended that the requirement to be on call regularly be restricted to the foremen, but that the assistant superintendents be subject to call in serious emergencies.

t. Monthly Reports of Sewer Repair Activities: The bureau of accounts prepares in great detail a monthly summary of all activities of the bureau of sewer repair, showing the location of each job performed in the bureau, with the exception of catch basins cleaned, and the total cost of labor, material, and trucks for each activity. This report is signed by the superintendent of the bureau and his two assistants and sent to the director of public works. A copy is retained in the office where it is filed, but as far as could be determined this copy is not put to any use whatsoever. A monthly report should be prepared for certain definite uses by management or, if it is not needed, it should not be prepared at all, thereby saving considerable clerical time and expense. It should be noted, however, that the reports are submitted almost two months late, and it is understandable that the time of effective use of the information has passed before the data are available.

In designing a monthly administrative report, it should first be determined exactly what information is currently needed by each unit head, division head, bureau head, department head, and those responsible for the city's administration, and only that information should be developed. Each monthly report should be prepared promptly and be made available to the operating officials within a few days after the last day of the period to which the report relates. Once that information is developed, it should certainly be used for the purpose for which it was intended, or the effort expended in the development of good records and a sound reporting system would not be justified.

The development of a good reporting system requires coordinated effort on the part of the bureau of accounts and the bureau of sewer repair. It is believed that an attempt at such a cooperative undertaking would undoubtedly result in a well-balanced, comprehensive reporting system.

It is recommended that a reporting system be developed to provide information essential to the management of the bureau by the several echelons of authority, that monthly reports of the bureau's activities be submitted regularly, and that they be prepared and be made available within 10 days after the close of a reporting period.

8. Equipment for Sewer Repair Activities

a. Present Equipment: The present complement of equipment in the bureau consists of 24 vehicles. The kind, make, and year of acquisition of the equipment is shown in the following tabulation:

	No. of Items	Description	Year Purchased
Passenger Cars			
	1	Buick sedan	1939
	1	Chevrolet coupe	1941
	1	Ford coupe	1941
	1	Ford coupe	1947
	2	Ford sedan	1947
	1	Plymouth coupe	1949
Eductors			
	1	Elgin - Faegol chassis	1928
	1	Elgin - Mack chassis	1937
	4	Elgin - Mack chassis	1944
	2	Elgin - Mack chassis	1948
	2	Elgin - Mack chassis	1951
Sewer Cleaning Unit			
	1	Chevrolet chassis	1934
	1	Ford chassis	1946
	1	Ford chassis	1947
	1	Chevrolet chassis	1947
	1	Chevrolet chassis	1948
	1	Chevrolet chassis	1949
Mounted Compressor			
	1	Ford chassis	1944

In addition, the bureau rents 11 trucks, of which five are two-cubic yard dump trucks and six are ton-and-a-half flat trucks.

The amount of equipment in use is adequate for catch basin cleaning and sewer cleaning purposes. However, it was reported that efforts to provide sufficient transportation for the sewer repair activities have met with no success, as discussed elsewhere in this chapter.

b. Equipment Cost Records: The cost records for all equipment of the bureau of sewer repair are maintained by the bureau of accounts. The average performance and cost for operating the sewer cleaning units, eductors, and the mounted compressor for the fiscal year of 1949-1950 are shown in the following tabulation:

Class of Equipment	Average Miles Run	Average Cost Per Mile	Average Miles Per Gallon	Average Expenses Repairs	Tires	Gas and Oil	Misc.	Total
Eductor	5707	$.2811	2.84	$ 622.86	$91.96	$389.50	$77.17	$1,181.46
Sewer cleaning unit	604	.3345	4.31	136.43	9.73	56.12	0.56	202.68
Compressor, mounted	6015	.2469	5.39	1,146.09	96.92	236.64	5.54	1,485.19

It is mentioned in other parts of this report, dealing with the equipment cost records of other bureaus, that the records are incomplete in several important respects and do not include depreciation, storage, or overhead. Furthermore, the records do not include the cost of the time that sewer repair crews spend on the repair and maintenance of the equipment. This cost is charged to the activity on which the equipment is used, which does not give a true picture of the cost of equipment repair and maintenance and also inflates the unit costs of the sewer repair activities. Cost records should be complete, not only for equipment management purposes but so that equipment cost may be accurately charged to activities and agencies. It is therefore recommended that complete equipment cost records be maintained and that monthly summaries of equipment operation be prepared for bureau officials.

c. Use of Eductor Crews for Vehicle Maintenance: Eductor crews are instructed to wash their vehicles at least once a week, and generally they do this on Friday afternoons between 4:00 p.m. and 5:00 p.m. The wages for one hour of a three-man eductor crew cost the city $5.82 without overhead charges, which represents an annual cost of $302.64 for each eductor or approximately $3,026 for 10 eductors. The use of eductor crews for washing vehicles should be stopped in view of the considerable expense of performing this work ($5.82 for each wash job) which should properly be performed by maintenance crews, preferably in a central equipment agency. The cost of this maintenance work should be charged to the equipment and not to catch basin cleaning. It is recommended that the practice of using eductor crews for performing maintenance work on vehicles should be discontinued, and that the maintenance work be performed by a central equipment agency.

d. Reserve Equipment for Catch Basin Cleaning: A chauffeur on an eductor is required to stay with his vehicle during the entire time while repairs are made. Often the laborers also stay with the vehicle unless it is known at the outset that the repairs will be of long duration, in which case only the chauffeur remains and the laborers are given temporary assignments on other work. Repairs are not made at night and at the present time there are no reserve eductors available. The tabulation presented earlier in this chapter on eductor operations reveals that an average of 66 hours a month for the months of February through May 1951 was spent on vehicle repairs. The cost of the chauffeur time alone for these 66 hours at the current rate amounts to $159 a month or $1,908 per year. The actual idle time of laborers is not known but it can safely be assumed that it is equivalent to that of the chauffeurs' or another $1,908 per year. This total cost for lost time is roughly equivalent to the wages of one laborer. The basic cause of this lost time is the lack of reserve equipment. If reserve equipment were available, a breakdown would merely mean the replacement of one vehicle by another and would keep work interruptions to a minimum. It is recommended in a

preceding section of this chapter that two eductor crews be eliminated as a result of restricting the use of eductors to catch basin cleaning, and that the two eductors be used exclusively as reserve units in the catch basin cleaning service. It is further recommended that, when a regularly assigned eductor is in the garage for repairs or for preventive maintenance, a reserve eductor be assigned to the eductor crew concerned, and that neither a chauffeur nor a laborer be permitted to remain with the eductors while they are in the garage.

9. Expenditures for Sewer Repair Activities

a. Expenditures of the Bureau: The expenditures of the bureau of sewer repair for the fiscal years 1949-1950 and 1950-1951 and the budget appropriation for the current year are shown in the following tabulation:

	Expenditures		Budget
	1949-1950	1950-1951	1951-1952
Permanent salaries	$ 34,193	$ 32,280	$ 39,960
Allowance for overtime	1,081	1,820	1,020
Allowance for holidays	700	350	531
Wages	418,139	430,338	482,313
Contractual services	22,223	22,982	27,482
Truck hire	58,161	56,000	52,255
Materials and supplies	44,320	43,600	39,625
Equipment	7,928	45,634	12,820
Services of other departments	8,591	9,420	9,335
Total (except pump stations and side sewers)	$595,336	$642,424	$665,341
Sewage pumping stations	$ 51,669	$ 54,962	$ 58,042
Side sewer repair	129,018	140,582	100,000
Total for bureau	$776,023	$837,968	$823,383

The budget appropriation shown above is less than the previous year's expenditures. This is due principally to two reasons. First, two eductors were purchased in the fiscal year of 1950-1951 which increased the expenditure for equipment considerably above other years, and no provision is made in the current budget for automotive equipment. Secondly, the budget appropriation for side sewer repair is in reality a revolving account or working fund and is not an estimate of the side sewer work for the year. The total expenditures for this work will probably exceed $140,000. The total annual saving which can be realized if the recommendations contained in this report are put into effect are estimated to be approximately $72,910, shown as follows:

$25,000	Eliminating two eductors
33,600	Reducing eductor crew to two-man operation
9,750	Changing working hours of hired trucks
4,560	Eliminating one operator in sewage pumping operation

There are other less tangible savings which are difficult to calculate, but which are, nevertheless, very real, such as the labor saving which can be realized by providing individual transportation to the top bricklaying crews. Such savings will be reflected in higher and better production at no additional cost to the city.

b. Expenditures for Sewage Pumping Stations: The expenditures for the fiscal years 1949-1950 and 1950-1951 and the budget appropriation for 1951-1952 for the sewage pumping stations are shown by appropriation items in the following tabulation:

	Expenditures		Budget
	1949-1950	1950-1951	1951-1952
Permanent salaries	$28,852	$27,740	$34,915
Allowance for overtime	-	-	75
Allowance for holidays	916	800	975
Leaves and replacements	-	1,622	-
Temporary salaries	1,138	2,500	1,889
Materials and supplies	2,269	1,950	1,736
Contractual services	16,305	17,650	16,575
Equipment	543	950	-
Services other departments	1,646	1,750	1,877
Totals	$51,669	$54,962	$58,042

If the recommendations contained in this report for the discontinuance of one shift at the Marina station, the increase of one shift at the Commercial Street station, and the elimination of one position of junior operating engineer are put into effect, it is estimated that an annual saving of approximately $4,560 can be made. At the same time, it is believed that providing an additional operator at the Commercial Street station will keep to a minimum the possibilities of overflow in the area. In addition, the release of one junior operating engineer from a permanent assignment should provide better coverage for all stations.

c. Expenditures for Side Sewer Repair: The bureau repaired and installed a total of 1,080 side sewers during the fiscal year 1950-1951 at a cost of $140,532 which was billed to the property owners for whom the work was performed. A breakdown of expenditures for that year is shown in the following tabulation:

Labor	$ 67,203
Material	8,295
Cartage	4,824
Inspection	2,052
Paving	34,918
Extras	3,532
Compressor	1,374
Overhead	18,334
Total	$140,532

The public works code provides that an estimate of cost for each side sewer job shall be made and that if the actual cost of the job is less than the estimate, then the city must return the difference, and, if the actual cost is greater, the property owner is required to pay the difference. In view of the considerable amount of clerical work involved in the procedure of preparing and billing side sewer costs, the city should give serious consideration to making side sewer repairs and installations on a fixed charge basis. Other cities have done this with apparent success, from the standpoint of both the city and the property owner. One of the great advantages of using fixed costs for this work is that all citizens are treated the same for the same service, and unusually high charges occasioned on one job by weather conditions, accidents, or other unusual conditions are avoided. Based on past experience, a schedule of fixed charges could be developed and it is believed that a carefully prepared schedule would reflect all operating costs on an equitable basis. Periodic revisions would have to be made to keep in step with changing costs of personnel, materials, and supplies.

It is recommended that the ordinances governing side sewer costs be revised to permit the use of fixed charges for side sewer repair and installation. It is further recommended that the bureau develop a schedule of fixed charges for the repair and installation of side sewers.

d. Paving Costs for Side Sewer Work: The repaving of side sewer excavations is being done by the bureau of street repair at a cost of $1.00 per square foot, and the cost is charged to the side sewer job and eventually is billed to the property owner. In the part of this report dealing with paving costs in the bureau of street repair it is shown that the total average cost of making asphalt pavement replacements over pavement openings is $0.51 per square foot, which includes the costs of cleanup and of overhead. It appears, therefore, that the paving charges made to property owners may be excessive. In the interest of equity they should be based on the actual cost to the city.

The bureau charged $34,918 to side sewer jobs for paving costs of 34,918 square feet of pavement over side sewer excavations. On the basis of the indicated actual cost the bureau should have charged $17,808. The difference between the charges and the actual cost of the paving work is $17,110, or approximately $15.00 per job. The difference is great enough to warrant a revision of paving cost charges to cover only the actual cost of such work. The cost of 51 cents a square foot was determined for one month of the current year and the sample may be too small to be valid. A more extensive calculation of actual cost should be made. It is recommended that the paving costs of side sewer repair work, billed to property owners, be equivalent to the actual costs of that work, and that the present charge of $1.00 per square foot be reduced to the average fixed amount that will repay the city for the work performed.

e. Revolving Fund for Side Sewer Repair: A budget appropriation of $100,000 is made every year and used as a revolving fund for side sewer repair work. Revolving funds are generally set up to cover probable expenditures for a month or two at the most, after which time credits to the funds are generally forthcoming to replenish operating funds. A $100,000 appropriation for side sewer repair work appears to be entirely too large, inasmuch as the total expenditures for that work for the fiscal year 1950-1951 were only $140,582. A large revolving

fund, when not required, merely ties up city funds and inflates the budget needlessly. It is therefore recommended that consideration be given to reducing the budget appropriation for the side sewers fund to approximately $50,000 annually.

f. Inspection Charge for Side Sewers: There is no adequate explanation of the inspection charge that is made for each side sewer installation or repair job that is performed by the bureau. A uniform charge of two dollars is made to each job. It is reported that this charge is for the purpose of reimbursing the city for the cost of inspection work performed by the bureau of engineering, and that, when the side sewer payments are received, the two dollars are credited to the general fund.

The streets and highways division of the bureau of engineering states, on the other hand, that utility trenches are inspected, but that no inspection is made of side sewer backfilling or repavement. It was reported from another source that the two dollar inspection fee is intended to cover the cost of the bureau of street repair supervision. Such a charge is hardly justified, however, because the bureau of streets does not make a systematic inspection of side sewer trenches, and an adequate overhead charge is added to cover such supervision and inspection as is made.

It is recommended that an inquiry be made into the reason for making inspection charges for side sewer work, and that if the charges cannot be justified, the practice be discontinued.

CHAPTER IX

REGULATORY INSPECTION OF BUILDING CONSTRUCTION AND MAINTENANCE

1. Introduction

The bureau of building inspection of the department of public works is responsible for some of the most important regulatory functions of the municipal government. The building inspection function was performed by the division of architecture until the earthquake and fire of 1906. Shortly after that time the bureau of building inspection was created and was first mentioned in the annual municipal report for the fiscal year ending June 30, 1907. The character of the bureau remained substantially the same until November 1949, at which time the electrical inspection division was transferred to the bureau from the department of electricity. Plumbing inspection, the remaining building control activity, is still in the department of public health.

On August 15, 1951, there were 551 positions, one of them vacant in the bureau. The total annual salary of the 51 positions is $290,760. The total appropriations for the bureau for the fiscal year 1951-1952 amount to $397,134 compared with actual expenditures of $287,020 in the fiscal year 1949-1950. The annual reports of the bureau show that the total revenues amounted to $339,246 in the fiscal year 1950-1951 and to $317,702 in 1949-1950. Thus, revenues exceeded expenditures in 1950-1951 by about $52,000 and in 1949-1950 by about $40,000.

Plumbing and fire prevention inspections are made by agencies outside the department of public works. As a part of this study, some examination was made of the scope of these operations and their relationship to the department of public works, but it was not possible to review the activities in detail. Nevertheless, sufficient study was given to justify certain conclusions and recommendations presented herein.

2. Functions and Activities

The principal functions of the bureau of building inspection are to administer and enforce the building code and the electrical code of the City and County of San Francisco and to enforce certain provisions of the zoning law. The bureau also enforces those laws and regulations of the State of California that deal with electrical installations not regulated by the city code, such as overhead line construction. The functions and activities of the bureau may be stated as follows:

a. Examining building and electrical plans and specifications to ensure conformance with the codes and regulations.

b. Approving the issuance of various permits such as building, occupancy, electrical, sign, billboard, and boiler installations.

c. Inspecting buildings during various stages of construction and alteration to ensure conformance with the building code.

d. Inspecting electrical wiring and installations or alterations to ensure conformance with the electrical code.

e. Inspecting the erection and alteration of signs and billboards to ensure conformance with the building and electrical codes.

f. Inspecting the installation of boilers to ensure conformance with the building code.

g. Inspecting, at the request of the police department, fire department, or the health department, places of public assembly, night clubs, spray painting establishments, nurses homes, and all coin-operated amusement devices with electrical controls.

h. Providing technical advice to the board of permit appeals on matters relating to the building and electrical codes.

i. Inspecting structures for obsolescence and deterioration on the receipt of complaints or requests from other departments or agencies and condemning those which are obsolete and unsafe for occupancy.

j. Notifying property owners of unsatisfactory building conditions and ordering corrections made, and prosecuting persons who refuse to make the stipulated changes in accordance with the building code, electrical code, and zoning laws.

k. Registering electrical contractors and plant owners responsible for plant electricians in conformity with the electrical code.

1. Enforcing the provisions of the ordinance governing the sale and display of electrical materials, devices, and appliances.

It appears that the bureau is also responsible for ensuring that owners maintain all buildings and structures in a safe condition in compliance with building and electrical code provisions. However, the bureau does not perform this function at the present time. The desirability of bureau performance of this function is discussed in another section of this chapter.

The bureau is given responsibility for making elevator and refrigeration inspections, but the building code does not provide fees for making such inspections. This responsibility of the bureau is not being executed at the present time.

3. Organization and Staff

a. Present Organization and Staff: The bureau of building inspection is headed by a superintendent of the bureau of building inspection who is a civil service employe appointed by and reporting directly to the director of public works. As of August 15, 1951, there were four main organization units within the bureau. The number of positions assigned to each unit and the annual payroll cost at that time are shown in the tabulation that follows:

Name of Unit	Title of Head	No. of Positions	Annual Payroll Cost
Bureau of building inspection	Superintendent of building inspection	1	$ 8,400
Boiler division	Boiler inspector	2	11,760
Building division	Supervising construction inspector	21	113,580
Electrical inspection division	Chief electrical inspector	23	126,420
Engineering division	Senior civil engineer	4	30,600
Totals		51	$ 290,760

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

The system of titles of the organization units and of the supervisors at the head of the units is not entirely consistent, and in some cases not clear. The similarity between the name of the bureau and that of the building division, for example, is likely to lead to confusion.

The positions assigned to each unit in the bureau and the annual payroll cost as of August 15, 1951, are shown in the tabulation that follows (lines of descending authority are shown by indentations of position titles).

Position	No. of Positions	Rate of Pay	Annual Payroll Cost
Superintendent, bureau of building inspection	1	$8,400	$8,400
Boiler inspector	1	5,880	5,880
Boiler inspector	1	5,880	5,880
Supervising construction inspector	1	6,480	6,480
Assistant engineer I, civil	1	5,280	5,280
Building inspector	11	5,880	64,680
Building inspector	5	5,400	27,000
General clerk-stenographer	2	3,420	6,840
General clerk-stenographer	1	3,300	3,300
Chief electrical inspector	1	6,480	6,480
Electrical inspector	15	5,880	88,200
Electrical inspector	1	5,640	5,640
Electrical inspector	2	5,160	10,320a/
General clerk	1	3,300	3,300
General clerk	1	3,180	3,180
General clerk-stenographer	1	3,420	3,420
Line inspector	1	5,880	5,880
Senior engineer, civil	1	8,100	8,100
Engineer, civil	3	7.500	22,500
Totals	51		$290,760

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a/ One position vacant as of August 15, 1951

The bureau also has attached to it three officers from the fire prevention bureau who inspect all building plans in accordance with the charter provisions to make sure that the fire code provisions are followed. The superintendent of building inspection has no supervisory control over the fire department personnel but there is a high degree of cooperation and coordination between him and the fire department representatives. Locating the fire department personnel in the offices of the bureau of building inspection eliminates much delay which would be inevitable if it were necessary to have building plans routed to other agencies.

b. <u>Plumbing Inspection</u>: The enforcement of the provisions of the plumbing code is now assigned to the plumbing inspection division in the department of public health. Plumbing inspection is an activity closely related to the activities of the bureau of building inspection and it is probable that some economies could be secured if plumbing inspection responsibility were placed in the bureau of building inspection. It is reported that efforts to secure this consolidation have been initiated but that a lack of office space has prevented any actual transfer of the plumbing inspection function to the bureau of building inspection. The authors of this report believe that to secure better coordination of inspection activities, greater convenience to the public, and possible economies, the proposed consolidation should be effected as soon as practicable. It is, therefore,recommended that responsibility for plumbing inspection activities be transferred from the department of public health and placed in the bureau of building inspection, and that a new plumbing inspection division be created in the bureau.

c. <u>Organization for General Office Services</u>: The clerical services of the bureau are new performed by six clerks. Three of these clerks report directly to the supervising construction inspector, three are supervised by the chief electrical inspector, and there is no appreciable interchange of clerical tasks between the two divisions. The engineering division and the boiler inspection division have no clerks of their own and are served by the clerks in the building division.

Under present practices, the heads of the engineering, boiler, and building divisions assign work directly to any of the clerical employes of the building division.This divided responsibility for making work assignments is not conducive to good office management. The lines of authority and responsibility for office activities should be clearly defined and a plan of organization developed to reflect operational procedures.

The practice of having the heads of the building division and the electrical division supervise clerical functions is not a good one. The work of these divisions is sufficiently complex and demanding to require that division heads give the maximum possible time to planning and supervising the technical activities. The clerical operations, on the other hand, are sufficiently routine to permit their delegation to a clerk of proper classification. The time of the clerical force could be

used to the best advantage in this manner and it would be possible to plan the work so that peak loads in any part of the bureau could be handled without confusion or delay. The consolidation of the clerical forces would not deprive any bureau head of clerical assistance and each clerk would do substantially the same kind of work as at present.

It is, therefore, recommended that division heads be relieved of the responsibility for supervising the bureau's clerical personnel and office procedures, that there be created in the bureau an office services division, to be headed by a chief clerk responsible directly to the superintendent, and that the new division be made responsible for handling all clerical work of the bureau.

d. Organization for Boiler Inspection: The boiler division is responsible for the inspection of the installation of all boiler and air tanks and the installation of direct and indirect fired hot water heaters and tanks to ensure compliance with the city and county, and state codes. In addition, the division makes regular internal inspections of all boilers and air tanks which are not covered by insurance.

The two boiler inspectors in the boiler division receive the same rate of pay although one of the inspectors has full responsibility for the proper functioning of the division and complete authority over the second boiler inspector. The present position titles and pay rates do not recognize this difference in authority and responsibility. Titles and pay rates should reflect this difference.

It is, therefore, recommended that the positions in the boiler division be reclassified as soon as practicable, and that a position of chief boiler inspector be established.

e. Organization for Building Inspection: The building division is responsible for enforcing the provisions of the building code, including the structural inspection of signs and billboards. The division examines all plans for new building construction and alteration and makes field inspections at various stages of construction to ensure compliance with the building code provisions.

The city is divided into 14 districts for the administration of building inspection activities, with one building inspector assigned to each district. There is no specialization of the building inspection functions. Each inspector is responsible for all building inspections in his district. The size of the districts varies with the extent of building activity, and the district plan has to be reviewed continually to maintain reasonably equal workloads for the field inspectors.

The plan of assigning one inspector to a district is accepted practice for this work, but the supervising construction inspector must be cognizant of changing inspection loads in each district and either change the districts in accordance with definite trends or arrange that inspectors with light loads help those with temporarily heavy work loads. It is recommended that a simple system of estimating comparative work loads in inspection districts be developed by the supervising construction inspector as a guide in making temporary adjustments and district revisions.

f. Organization for Electrical Inspection: The principal responsibility of the electrical inspection division is to enforce compliance with the electrical code of the city and involves the review of electrical plans, the inspection of all electrical installations, the inspection of electrical sign erection, the approval of electrical materials offered for sale in the city, and the registration of all electrical contractors. The division also inspects overhead line construction work.

A cashier from the central permit bureau is attached to the electrical inspection division on a full-time basis. The cashier issues permits and collects fees which are turned in at the end of each day to the central permit bureau. The primary reason for assigning a cashier to the electrical inspection division on a full-time basis is to provide greater convenience to the electrical contractors. This matter is discussed in detail in another part of this report.

For purposes of administering field electrical inspection work the city is divided into 14 districts (not the same as building inspection districts) and an electrical inspector is assigned to each. In addition, two electrical inspectors are assigned to enforce the electrical sales ordinance and one inspector to inspect overhead line construction. A discussion of specialization in this division is presented elsewhere in this chapter.

g. Organization for Engineering: The engineering division is responsible for the formulation and proposal of all bureau policies regarding structural matters, for the review of engineering data submitted in connection with the approval of new materials and assemblies, and for the review of all plans involving important structural engineering design. The engineering division also advises other divisions of the bureau and other city departments regarding structural matters. The senior civil engineer is on the committee responsible for formulating and proposing revisions to the building code.

Although all of the engineers on the staff are presumed to be able and competent to examine all types of plans processed by the division, a certain amount of specialization has developed. All work in connection with fire escapes is generally referred to a particular engineer. Another does most of the work in connection with alterations. Another specializes on sky lights. Plans for other structures or parts of structures may be examined by any of the staff. This type of limited specialization is sound, since it is carried out on a minor scale but still provides the advantages generally resulting from specialization.

h. The Proposed Organization of the Bureau: The proposed plan of organization for the bureau of building inspection is presented in the following tabulation:

Name of Unit	Title of Head of Unit
Bureau of building inspection	Superintendent of building inspection
Construction inspection division	Chief construction inspector
Electrical inspection division	Chief electrical inspector
Plumbing inspection division	Chief plumbing inspector
Mechanical inspection division	Chief mechanical inspector
Engineering division	Senior civil engineer
Office services division	Chief clerk

It will be noted that some changes are proposed in the names of units and in the titles of supervisory positions. The proposed titles are for administrative purposes and it is not necessary that the civil service titles should be changed, although in some instances a change would be desirable. It is recommended that the above organization plan be put into effect as soon as practicable, and that the names and titles shown in the tabulation be adopted.

4. General Operating Practices

a. General Appraisal of Practices: Construction and alteration of buildings in the city, including electrical and boiler installations, are well regulated, and, with certain exceptions, complete service in the promotion of public safety in buildings is provided. The operating practices of the bureau include several weaknesses which should be corrected to secure greater efficiency. Supervision and reporting procedures should be strengthened. There is also considerable need for coordinating the procedures of the several divisions of the bureau to secure better operation. This section deals with those procedures in the bureau of building inspection which should be revised or altered to promote either efficiency or economy.

b. Reporting of Inspections: The records of the bureau are generally designed to provide management with sufficient data to permit a proper analysis of the operations of the bureau. However, the reports prepared from the records are not summarized by kinds and types of inspectional activity. Such a summary is essential for analyzing the work of the field inspection personnel to determine the necessity for specialization or consolidation, the adequacy of fees, or any other administrative problem.

The bureau compiles records showing the different types and numbers of inspections and the time spent on investigating complaints and furnishing information to the public, and subsequently to report to the director of public works all of these activities under one heading of inspections. The result is that the number of inspections reported by the bureau for the building (called construction division in the proposed organization), and by the electrical, and boiler (called mechanical division in the proposed organization) divisions cannot be used to develop any type of comparison or

analysis of the separate activities of the bureau.

The management should determine the kind of information which is required by the several echelons of authority in making an appraisal of bureau operations and should design reports to provide that information. Above all, the reports should reflect accurately the various types and extent of activity conducted by each division of the bureau. As a minimum requirement, the reports should show the time, expense, and number of inspections separately for structural, sign, billboard, demolition, flue, boiler installation, boiler inspection, electrical installations, electrical sign permits, electrical sales, contractors registration, and plant owners registration. It is, therefore, recommended that the bureau of building inspection reporting system be revised to provide an accurate and comprehensive account of the bureau's activities.

c. Review of Daily Reports of Building Inspectors: The review of the inspectors' daily reports in the building division is seriously neglected.

An analysis of the inspectors' daily reports for May, 1951, showed that complete reports were not available for any one day during that month, and some reports were improperly prepared. Since monthly and annual reports are developed from these daily reports, it is important that they be maintained as completely and as accurately as possible. Because of the difficulty of exercising adequate field supervision in building inspection, considerable reliance should be placed on a competent review of daily reports. These reports should be complete and accurate or their value becomes negligible. It is, therefore, recommended that a thorough review of daily reports be made to ensure their adequacy and completeness.

A review of the daily reports should also be made to aid in the supervision and analysis of building inspection operations. The review of the inspector's daily reports for May, 1951, showed that a considerable proportion of inspector's time is spent in handling complaints and requests for information and investigations. A summary of the daily reports of one inspector shows that, out of a total of 160 hours for the month of May, 1951, he spent 40 hours in the office, 33.5 hours handling requests for information, and the remainder, 86.5 hours, on inspection work. On each day of the month this inspector spent from one to three hours in addition to his office time, or approximately 21 percent of his total time, in handling requests for information.

Another inspector had the following breakdown for 176 hours during the month of May, 1951: 45 hours office time, 24 hours for requests for information, 19.5 hours for complaints and investigations, and only 87.5 hours, or less than half of his total time, on field inspection work. Other instances of inspectors consistently spending a considerable percentage of their time on other than inspection work were noted.

A review of the inspectors' daily reports is essential to reveal situations similar to those just mentioned so that the bureau management can take appropriate steps to correct or adjust those factors creating such situations. It is, therefore, recommended that the inspectors' daily reports be reviewed to provide an analysis of the amount of time spent on activities other than the actual inspections of buildings.

d. Field Supervision: Field supervision in the bureau is generally inadequate and weak. The supervising construction inspector in the building division spends a total of six hours a week on field supervision. The six hours each week are divided between two of the districts. Since there are 14 districts, each district is inspected once every seven weeks. This amount of time devoted to field supervision in the building division is entirely inadequate to secure thorough supervision. The field supervision by the supervising construction inspector consists of driving through a district and spot-checking building construction in progress and making actual inspection reviews. Although this type of field supervision has some value, it is not generally satisfactory because it is difficult to identify building alteration jobs by merely driving through a district. The supervising construction inspector should continue to spot-check inspections but on a more systematic basis, perhaps by accompanying a building inspector on his inspections or by making a follow-up inspection of particular construction or alteration jobs shortly after the building inspector completes his inspection.

The chief electrical inspector reports that he spends a considerable amount of time in the field consulting with electrical contractors and electrical inspectors. These consultations provide the chief electrical inspector with some opportunity to observe the work of the electrical inspector. However, in the absence of a request for a field consultation the chief electrical inspector does not make periodic field inspections to follow up the work of electrical inspectors. This should be the primary duty of the chief electrical inspector so that he may judge the effectiveness and accuracy of the electrical inspections.

It is, therefore, recommended that the supervising construction inspector and the chief electrical inspector spend a minimum of four hours a day in field supervision.

e. Office Hours of Field Inspection Personnel: The working hours of the personnel of the bureau of building inspection are from 8:00 a.m. to 5:00 p.m., with one hour for lunch, five days a week. The field inspection personnel is required to report to the office two hours a day from 8:00 a.m. to 9:00 a.m. and from 4:00 p.m. to 5:00 p.m. On the basis of the actual salaries of the whole field inspection staff, two hours of office time every day represents an annual cost of $48,510. Two principal reasons are given for requiring inspectors to report to the office one hour in the morning and one hour in the afternoon. First, the superintendent of the bureau considers this a good means of exercising supervisory control over field personnel, and secondly, the field inspectors are on hand to answer public queries made by telephone or in person.

It is recommended elsewhere in this report that field supervision and office control of field inspectors be considerably strengthened. The adoption of these recommendations should make it unnecessary to rely for supervisory control exclusively on the practice of having the inspectors report to the office twice a day. Furthermore, the recommendation made later in this report, for strengthening office control of field inspections by requiring job cards to remain in the office when not in use would permit the inspectors on counter duty to supply much of the information requested by the public, and thus relieve the field personnel of this responsibility. In addition all field personnel should be required to telephone the office at certain times of the day to receive any calls demanding immediate attention.

It is proposed that the office time of the field inspectors be tentatively reduced to one period of $1\frac{1}{2}$ hours a day from 3:30 p.m. to 5:00 p.m. The saving of a half hour per day per inspector represents a saving in salaries of approximately $12,127 annually to the bureau. This saving would permit a reduction of one electrical inspector position and one building inspector position. There should be a frequent appraisal of this plan to determine its adequacy and effectiveness. If experience indicates that inspectional production has not increased as a result of the proposed plan, further changes should be made, perhaps to require the field personnel to report to the office at 8:00 a.m. and to leave immediately for the field districts. It is, therefore, recommended that the office hours of field inspection personnel be restricted to from 3:30 p.m. to 5:00 p.m. daily. It is further recommended that as vacancies in building inspector and electrical inspector positions occur the number of each of these classes of positions be reduced by one for regular district inspections.

f. Central Office Control of Building Inspection Work: After an application for a permit has been made and the permit granted, the building information is taken from the permit application and routed to the building inspector from the central permit bureau. This form serves as the inspector's job card and remains in his possession until a job is completed, when it becomes part of the office records. Since many jobs are kept alive for months and even years, and the job cards remain in the inspector's possession, the office has no record of that job for that entire length of time. This is undoubtedly one reason why members of the public have to talk personally to the inspector to secure job information and why the inspector has to spend so much of his time in the office. It is proposed that a district file of live jobs be maintained in the office. In routing his daily work the inspector should pull out of his file only those cards that he will use that day. Under such a system, job cards should not normally be out of the office for more than a day at a time. This procedure would permit the building inspectors on counter duty to give most of the information contained on the job cards. This system would have the advantage of providing faster information service, it would decrease the amount of time the inspector would be required to spend in the office, and would also keep in the office all records except those being used on any one particular day. A record of the locations of all jobs for each inspector should be given to the supervising construction inspector for purposes of supervisory control. It is, therefore, recommended that an inspectors' daily work file be established in the building division and that all job cards not required on any one day be kept in this division file for general office reference. It is further recommended that a daily listing by location be made of all job cards in use by each inspector in the approximate order of work.

g. Inspections of Elevator and Refrigeration Installations: The bureau does not now make elevator or refrigeration installation inspections, although the unit is required to make them under the building code. The state inspects elevators in only those buildings in which maintenance men are employed in connection with the upkeep of the buildings. Elevators in buildings where there is no maintenance staff are not inspected at all. Neither is there any inspection of refrigeration installations by the state or the city and county. The potential hazards to public safety of improper or inadequate elevator and refrigeration installations are generally recognized throughout the country, and the authors of this report believe that it is necessary to make elevator and refrigeration installation inspections. The bureau is now preparing proposed amendments to the building code which would require the boiler division to make inspections of refrigeration installations and all elevators which are not inspected by the state and to charge a fee for such inspections. It is recommended that the building code be revised to require the bureau of building inspection to make inspections of refrigeration installations and of elevators not under the juris-

diction of the state and to establish permit fees for these regulatory services.

The proposed addition of new activities to the boiler division would require the employment of another inspector for this division. The cost of making elevator and refrigeration installation inspections, including the salary of the additional inspector, should be met by permit fees charged for the making of these inspections.

h. Specialization of Overhead Line Inspections: The line inspector enforces the rules for overhead line construction of the State of California and the electrical code of the City and County of San Francisco. During 1949-1950 the line inspector made 5,956 overhead line inspections and during 1950-1951 he made 4,826 inspections. This type of specialization is desirable only where there is a sufficient activity to warrant it. The sharp decline in the number of inspections from 1949-1950 to 1950-1951 indicates the importance of this specialized activity. A continued decline in the activity should make doubtful the need for its continuance on a specialized basis, and its integration with other inspection work should be considered. It is, therefore, recommended that the management make periodic appraisals of the line inspection activity to determine the necessity and advisability of continuing it on a specialized basis.

i. Consolidation of Electrical Sign Inspections: The building division now inspects the structural aspects and the electrical division the electrical aspects of electric sign installations. Of the two types of inspections the electrical inspection is generally the more technical on small signs. On a typical small electrical sign the building inspector inspects for proper height, extension from the building, the adequacy of braces and brackets, and the security of fastenings, generally by observation from the ground. The electrical inspector is required to make a more detailed inspection of the wiring and electrical connections. It appears that an electrical inspector could make both inspections at one time on most electrical signs. Signs of exceptional size or questionable erection could be referred to a building inspector.

If sign inspection work is thus consolidated, consideration should be given to the advisability of using one or two electrical inspectors to make all sign inspections and to specialize in that work. The bureau has not, however, developed data to show the number and kind of sign inspections made by building inspectors and electrical inspectors, and such data are essential to permit an analysis of the possibility and desirability of such specialization. There may not be enough work of this kind to keep one sign inspector busy on a full-time basis. It is, therefore, recommended that the superintendent of the bureau of building inspection analyze electrical sign inspections by the building division and by the electrical division to determine the need for the consolidation and specialization of this work within the electrical division.

j. Complaints: The method of processing complaints in the bureau is generally inadequate. It does not provide management with a means of evaluating either the complaint or the manner in which it was handled.

Complaints in the building division are generally received by telephone by one of the building inspectors assigned to counter duty. These complaints are noted on slips of paper and given to the inspector in whose district the complaint originated. The inspector then follows up the complaint as part of his daily activities. The original complaint is not registered nor is any information provided by the inspector showing the disposition of the complaint. There is provision on the inspector's daily report for the entry of the number of complaints and the number of requests for information handled. However, there is no breakdown on this information so that there is no way of knowing which part of a total figure represents actual complaints and which part represents requests for information. The total number of both for the fiscal year 1950-1951 was 2,856.

An exception to the above procedure in the building division is in handling complaints relative to places of public assembly such as night clubs and dance halls for which a formal complaint report is made on a form provided for that purpose. Requests for information concerning condemnations and other important matters are similarly recorded. These complaints or requests for information are called "numbered complaints" and upon notification of such a complaint the inspector is required to submit a report, within three days, on its nature and disposition. The clerical staff maintains a tickler file to check the prompt handling of numbered complaints. The total number of numbered complaints, including requests for information, for the fiscal year 1950-1951 was 55.

The method of handling complaints and requests for information in the electrical division differs from that in the building division. Each complaint, request for information, and request for special inspections is recorded on a "Specials" form which is put in the box of the inspector concerned. These forms are regularly handled as part of the electrical inspector's daily routine unless some urgency is required in which case the matter is brought to the inspector's attention when he makes his daily call to the office at noon. The disposition of the special request or complaint is noted on the form, and the form is returned to the office for approval of the chief electrical inspector. It is then filed in the office for a period of approximately five years. There were 8,061 such specials recorded in the fiscal year 1950-1951.

The method of processing complaints and requests for information in the building division is inadequate and precludes the objective use of such information by the management of the bureau. The method employed by the electrical division is good and should be adopted as the standard method for the bureau. However, in either case, the present system of recording complaints, requests for information, and special requests as one total figure does not provide data for evaluating performance or for planning bureau operations. Sufficient data are available in inspectors' reports to permit a simple breakdown of complaints which would provide the bureau superintendent with more adequate and useful information. It is, therefore, recommended that the bureau develop a standard method of receiving,handling, and reporting complaints, requests for information, and special requests for inspections.

k. Interdepartmental Relations: The nature of the work of the bureau of building inspection requires continual contacts with other bureaus and departments. The processing of an application for a permit, for example, usually requires the cooperation of at least four different bureaus and departments. In many instances, depending on the nature of the construction work, other departments are required to approve a building permit application. The present procedure on routing permit applications is satisfactory. It generally takes three days for the complete processing of an alteration permit and about ten days for a permit for new construction. In view of the many approvals required in processing applications, the elapsed period between an application for a permit and the issuance of the permit is considered to be relatively short. This type of inter-agency cooperation can be applied with great benefit to other phases of the bureau's activities, such as the processing of certificates of occupancy. In many instances certificates of occupancy have been held up by the bureau for several years and eventually not issued at all. A complete discussion on this matter is contained elsewhere in this report.

The bureau of building inspection does not now make regular inspections of existing structures to find building code violations except on request or complaint. Even public buildings, places of public assembly, hotels, or hospitals are not periodically inspected to insure public safety. In view of this fact, every effort should be made to receive information on code violations from whatever source possible.

In the pursuing of their regular activities, employes of the fire, health, and plumbing agencies have the opportunity to see conditions which indicate a need for building inspection. It is reported that such a need is now being reported on a limited and informal basis. For example, fire prevention personnel will at times call the attention of an electrical inspector to conditions which may possibly violate provisions of the electrical code. The electrical inspector enters the referral on a "specials" form and investigates the suspected violation. There should certainly be more of this type of cooperation between departments. It is not proposed that

plumbing inspectors, sanitation officers, or firemen be made into electrical or building inspectors, but that employes of city bureaus and departments should be aware of the problems of other bureaus and departments in order to extend valuable cooperation. Brief lectures could be given by the bureau of building inspection to personnel of other departments to disseminate general information relative to the building and electrical code. Such lectures could provide sufficient training to permit the detection of simple violations of the codes for referral to the bureau of building inspection. The bureau should provide other departments with standard forms for making referrals, and procedures should be established for the submission and routing of the proposed referrals to the proper division within the bureau of building inspection. Interdepartmental cooperation on this basis would compensate in part for the lack of a regular maintenance inspection, and would entail no additional cost to any city bureau or department. This type of interdepartmental cooperation is desirable even if the bureau inaugurates regular maintenance inspections. It is, therefore, recommended that the bureau of building inspection take steps to enlist the cooperation of other city bureaus and departments in providing information about violations of the building, electrical, and other codes; that simple procedures and standard referral and reporting forms be developed and put into effect; and that efforts be made to acquaint employes of other agencies, who frequently enter and inspect both publicly and privately owned buildings with the requirements of the building codes.

1. <u>Inspection of Existing Buildings:</u> The building and electrical codes governing the functions of the bureau of building inspection require building property owners to maintain all buildings and structures in a safe condition. The codes also stipulate that the director of public works is responsible for the enforcement of the code provisions. By implication, then, the director of public works is responsible for inspecting all buildings and structures to determine whether or not the owner is complying with code provisions. However, there is not complete agreement in the department of public works as to the extent of the department's responsibility to inspect existing buildings. The department's duties under the codes should be clearly determined by amending applicable sections of the codes, and if it is decided to require a regular inspection of existing buildings, adequate funds should be provided. It is probably not practicable at the present time to require the city to perform regular maintenance inspections on all buildings and structures within the city.

Apart from the legal requirement, however, there is also a need to determining whether or not such inspections are necessary to safeguard the people of the city. There is general agreement among those responsible for building inspection that it is desirable and necessary to make periodic inspections of places of public assembly in the interest of public safety. There is not general agreement, however, on the meaning of the term "places of public assembly." Some city codes restrict regular inspections to theatres, schools, hospitals, hotels, dance halls, auditoriums, and the like, while others go much farther and include office buildings, factories, and large apartment buildings. It is believed that, as a minimum, the bureau

should make regular inspections in all public buildings, theatres, hotels, schools, hospitals, and other places to which the general public has access. It is highly desirable, also, to extend the scope of the regular preventive regulatory inspection work to include factories, office, apartment, and other large buildings. In any case, it will probably be desirable to expand gradually the inspection of existing structures.

It is recommended that the building and electrical codes be revised to define exactly the responsibility of the bureau of building inspection for making periodic inspections of existing buildings to ensure compliance with the provisions of the codes. It is further recommended that the building and electrical codes be revised to require the bureau of building inspection to make regular, periodic inspections of all places of public assembly, and to state specifically what kinds of buildings are to be considered as places of public assembly.

m. Need for Coordination: There is a lack of coordination of the activities and procedures of the several divisions of the bureau of building inspection. The principal weakness is that the work of the electrical inspection division does not conform with the established procedures of the bureau. This division only became a part of the bureau in November 1949 and some time was needed for the bureau management to become thoroughly familiar with the operating procedures of the new division. It is suggested that the superintendent should take active steps to secure consolidation of the operating procedures of all divisions of the bureau and to make the electrical inspection division an integral part of the bureau. The integration should be secured through an analysis and evaluation of the procedures of all the divisions and the adoption in all divisions of common procedures and practices. It is recommended that the superintendent of the bureau of building inspection take immediate steps to improve coordination within the bureau. It is further recommended that the superintendent hold regular staff conferences and meetings of supervisiors, and that he make administrative studies of the work of the bureau for the purpose of improving coordination in the bureau's activities.

5. Transportation

a. Distribution of Automobiles: The inspectors of the bureau of building inspection use two kinds of transportation - city-owned automobiles and public transportation. The bureau has allocated to it 29 automobiles. The number of automobiles assigned to each division and the average monthly mileages during the fiscal year 1950-1951 are shown as follows:

Unit	No. of Automobiles	Vehicle with Minimum Monthly Mileage	Average Monthly Mileage	Vehicle with Maximum Monthly Mileage
Bureau of building inspection	1	558	282	
Boiler division	2	558	562	565
Building division	15	310	532	792
Electrical division	9	509	632	786
Engineering division	2	319	329	339

All of the district inspectors in the building division have city-owned automobiles but only seven of the district inspectors in the electrical division are assigned automobiles. A review of the average monthly mileages shown in the foregoing tabulation reveals the necessity of appraising the real need for automobiles of several of the building inspectors with low mileages in comparison with the need of several electrical inspectors who do not have an automobile. It does not seem that the two building inspectors in the downtown area (average monthly mileages of 385 and 387, less than 18 miles a day) need automobiles.

The comparative needs of each building and electrical district should be determined in order to make an efficient and economical distribution of automobiles.

The possibility of forming an automobile pool for the building inspector whose duties keep him in the office half of each day, and for the engineering division should be studied. The low mileages of the three automobiles assigned to the above positions suggest that perhaps two vehicles on a pool basis would adequately serve the needs of these positions. The extra automobile would undoubtedly be of greater use to the field personnel of the electrical division. In addition, the automobile presently assigned to the superintendent should be made available to the pool when not in use.

It is recommended that the bureau make an analysis of the present distribution of automobiles to determine the comparative needs of each building and electrical district and assign the automobiles to those districts having the greatest need for them. It is further recommended that the three vehicles presently assigned to the engineering division and to the building inspector with half-time office duties be reduced to two and that these be used on a pool basis.

b. Equipment Management: The automotive equipment of the bureau is serviced and maintained by the purchasing department. The age, speedometer reading as of September 1951, and the cost of repair and maintenance of each vehicle for the fiscal year 1950-1951 are as follows:

Automobile Number	Year of Model	Speedometer Reading as of Sept., 1951	Cost of Repair and Maintenance for Fiscal Year 1950-1951
4	1946	20,366	$ 76.85
51	1942	38,114	216.42
52	1947	70,038	232.95
53	1942 a/	93,008 c/	86.82
54	1947	20,357	145.00
55	1940 a/	64,230	175.25
56	1942 a/	76,292 c/	95.89
60	1940 a/	54,429	182.63
61	1940 a/	50,797	279.73
62	1946	29,243	105.64
63	1947	23,499	63.67
64	1947	31,490	223.70
65	1947	27,211	41.08
66	1947	19,521	33.75
67	1947	21,042	48.17
68	1947	15,258	58.38
69	1947	25,939	69.50
71	1948	27,476	75.81
72	1948	21,321	53.26
82	1949	8,049	36.50
84	1941	54,325	203.09
85	1941	66,199	229.64
89	1942	54,031	119.60
91	1947	34,029	127.23
92	1947	27,738	226.38
93	1948	18,358	128.05
94	1948	20,546	58.08
99	1950	3,354	62.75
100	1950	3,566	23.69
103	1951 b/		
104	1951 b/		
		Total	$ 3,479.51

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a/ Purchased second-hand
b/ Purchased October, 1951
c/ Traded-in October, 1951

Automobiles are apparently traded in only after they have been driven approximately 70,000 miles without sufficient regard to the condition of the vehicle or the cost of repair and maintenance. The foregoing tabulation shows that repair and maintenance costs for the older vehicles are excessive. These high costs can be expected to continue for several more years since the mileages on some of the older vehicles do not approach the 70,000 figure and they are therefore not due to be retired. A more realistic and flexible criterion for determining the time of trade-in would be the total operating cost instead of the mileage. It is recommended, therefore, that the total operating unit cost be the principal factor used in determining the time of replacement of old vehicles and that the present policy of using mileage figures as the determining factor be discontinued.

6. Building Inspection Revenue

a. Current Revenues: Revenues earned by the bureau during the fiscal years of 1949-1950 and 1950-1951 were reported as follows:

Regulatory Service	1949-1950	1950-1951
Building permits a/	$ 211,262.30	$ 226,630.30
Billboards	1,038.00	689.00
Boiler installations	1,536.50	915.50
Boiler inspection	4,763.50	4,546.50
Demolition permits	3,050.00	2,240.00
Electrical wiring inspections	75,531.39	83,584.60
Electrical signs	5,134.90	5,057.95
Electrical contractors' registration	12,100.00	10,700.00
Plant owners' electrical registration	710.00	630.00
Flue registration	2,575.50	4,557.00
Electrical sales permits		190.00 b/
Subpoena fees		6.00
Totals	$ 317,702.09	$ 339,246.85

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a/ Includes sign construction permits.

b/ Collection of electrical sales permit fees transferred to Central Permit Bureau as of July 1, 1951. Receipt of $190.00 collected from new applicants from March 15, 1951, when new ordinance was published to July 1, 1951, effective date of transference.

b. Permit Fees: The charter provides that the board of supervisors shall fix the fees to be charged for permits, so that the fees are not less than the cost to the city and county of the regulation and inspection work involved. It is implied in this provision that the amount of the fees for each regulatory service provided by the bureau of building inspection should be large enough to meet not only the bureau expense of the service but also the cost to other bureaus and departments of processing plans and reviewing permit applications. The fire department, the city planning commission, the bureau of

engineering, and the central permit bureau regularly investigate and pass on applications for certain permits. The total expense of these agencies on building permit work is estimated to be $49,500 at the present time which means that the total permit revenues should exceed the total bureau expense by at least that amount.

The estimated revenues and expenses for the current fiscal year are shown by major categories in the following tabulation.

Kind of Regulatory Service	Estimated 1951-52 Revenues	Estimated 1951-52 Expense		
		Salaries	Other	Total
Building inspection a/	$234,116	$144,180	$12,650	$156,830
Boiler inspection	5,462	11,760	1,032	12,792
Electrical inspection	107,000	114,660	10,060	124,720
Electrical sales permits	23,180	11,760	1,032	12,792
Totals	$369,758	$282,360	$24,774	$307,134

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a/ Including engineering division, signs and billboards, demolition, and flue registration.

It would be desirable to compare revenues and expenditures for each kind of permit, but although the revenues are classified in sufficient detail, it is not possible to secure expenditure data more detailed than those given in the above tabulation.

It is evident that the building permit work as a whole satisfactorily pays its own way. It may be noted, however, that based on the estimated revenues and expenses the boiler and electrical inspection work is not self-supporting.

e. Fees for Building Permits: The fees for building permits (not including electrical or plumbing work) are based on the total estimated cost of the proposed construction or alteration work. The total estimated cost is taken as ninety percent of calculated cost produced by multiplying the floor area by the standard unit cost for the type of structure under consideration. The standard unit cost for a particular type of building is determined and kept up-to-date by the bureau to represent as accurately as practicable the current average cost of actual construction work of that type. The unit costs in use on October 31st are shown in the following tabulation:

Type of Building	Cost per Sq.Ft. of Floor Area
Groups A, B, and C	
Type I - Concrete or Steel	$ 17.06
Type II - Wood and Masonry	10.41
Group D	
Type I - Concrete or Steel	18.77
Type V - Wood frame	8.22
Groups E, F, and G	
Type I - Concrete or Steel	7.80
Type III - Wood and Masonry	5.64
Type IV - Steel frame unplastered	4.99
Type IV - Steel frame plastered	5.49
Type V - Wood frame	4.21
Group H	
Type I - Concrete or Steel	14.42
Type III- Wood and Masonry	9.66
Type V - Wood frame	6.97
Group I	
Ty. III - Concrete Block	9.33
Type V - Wood frame siding	8.30
Type V - Stucco	8.05
Type V - Brick	11.42

The fees now charged for building permits are shown in the following tabulation:

Total Estimated Cost of Construction, Alteration or Repair	Permit Fee
$500 or less	$4.00
$500 to and including $25,000	$5.00 per $1,000 of cost or fraction thereof
$25,000 to and including $50,000	$125.00 plus $3.00 per $1,000 or fraction thereof for part over $25,000
Over $50,000	$200.00 plus $1.10 per $1,000 or fraction thereof for part over $50,000.

The total cost means the final cost upon completion and includes mechanical, electrical, and plumbing work, even though other permits to perform such work may be required.

Sign permit fees and billboard permit fees are $2.00 unless the signs or billboards cost over $100 in which case building permit fees are charged on lighted signs.An electrical permit must also be secured.

This fee structure and method of computing fees has several advantages because the fees are based on a realistic estimate of costs of construction and do not depend on estimates supplied by applicants which may generally be expected to be low. It is believed that the present methods of estimating construction costs and of establishing permit costs are good and should be continued.

The revenues from fees in connection with the building inspection permits were $217,925.80 in the fiscal year of 1949-1950 and $234,116.30 for the fiscal year of 1950-1951. These revenues are considerably in excess of the expenses of the bureau for processing building permits and inspecting the construction or alteration work, and are substantially greater than the total costs to the city for the regulatory service. It is unfortunate that the records do not show separately the expense for building, sign, demolition, and flue permits so that the comparative revenue and expense for each type can be determined.

It is probable that the building permit fees this year will exceed the total cost to the city for providing the regulatory service by at least $60,000, and that the proceeds from this service are,in effect,contributing to the cost of regulatory services that are not self-supporting. An administrative study should be made to determine the effect of adding certain desirable activities(such as maintenance inspections)to the work of the division and of effecting certain economies suggested in this report. If an adjustment of fees is found to be desirable, the changes should be proposed for adoption. It is recommended that such a study be made.

d. Fees for Electrical Permits: The established permit fees for electrical installations and inspections are based on the cost of the inspector's time for making the various inspections plus an additional amount to cover transportation, administration, and other expenses involved. A separate fee is designated in the electrical code for each kind of fixture, outlet, and equipment installed. The fees range from five cents each for certain outlets to four dollars each for large electric motors.

It was recognized that the revenues for the past few years have not been adequate to cover even the personal services expense of the electrical inspectors and accordingly a new schedule of fees was established on March 15, 1951,when the electrical code was revised. The fee receipts experience since March may be too limited to furnish an accurate forecast of electrical permit revenue, but it is unlikely that the new fees will provide sufficient revenue to cover all expenses of electrical inspections unless some of the

recommendations to increase the effectiveness and output of the inspection force contained in this report are put into effect. At present salary rates, the estimated personal service expense of the division for electrical inspections for 1951-1952 is $114,600 and the probable total expense $124,720. In comparison, the indicated revenues for the same year are only $107,000 and it is estimated that this amount is at least $17,720 less than the total cost of electrical inspections.

It is recommended that the level of receipts from electrical permits be watched closely and that the fees be increased if the present level is too low to meet charter requirements.

e. Fees for Boiler Permits: Extensive fee schedules have been adopted for installing or inspecting various kinds and sizes of boilers and other pressure vessels. It is presumed that it was intended to base the fees on the total estimated average cost of making the particular inspections and investigations, but the total revenues for the past two years have repaid little more than the salary of one of the two boiler inspectors.

The fees for boiler inspections and boiler installations totaled $6,300 in 1949-50 and $5,462 in 1950-51. The expected revenue for the current year is about the same as for 1950-51 and the probable bureau expense is about $12,800. It is apparent that the fees are now much too low to make the boiler division self-supporting and make no provision for the expense incurred by other agencies in reviewing permit applications.

It was recommended in a preceding section that permit fees be established for refrigeration and elevator inspections and installations. Bureau officials feel that if this proposal is put into effect, the additional revenue realized will make the division self-supporting. It is pointed out, however, that an additional inspector will undoubtedly be needed to make the extra inspections and that unless the fees for the new work are at a high level, it is unlikely that present deficits will be removed. In any event, it is believed that boiler and pressure vessel inspections as well as all other regulatory services should be at least self-supporting.

It is recommended that the fees for boiler and pressure vessel installations and inspections be revised as soon as possible so that the total revenue from the service equals the total cost of application, review, and inspection work.

f. Fees for Electrical Sales Regulation: The permit fees for electrical materials inspection and regulation are established in the electrical code. An annual fee of $10,00 is fixed for all retail establishments selling electrical materials, devices, and appliances. A flat rate of $10.00 for all retail outlets regardless of their size does not appear equitable, but for ease of administration, a flat rate has a considerable advantage over rates varying with the amount of sales. The latter method would require an examination of store records which would certainly displease dealers and would require additional city personnel to enforce the collection of fees.

Prior to July 1, 1951, fees from electrical sales permits were collected by the tax collector, but they are now collected by the central permit bureau. The approximately 2300 electrical retail outlets will provide annual revenues of about $23,000. The maximum salary of both of the electrical inspectors required to enforce the electrical sales ordinance amounts to $11,760 at present salary rates. The other bureau expense is about $1,000, indicating that the revenues will probably exceed the total cost to the city by about $10,000.

It is suggested that such a discrepancy between receipts and expense would justify administrative inquiry to determine, first, whether or not additional inspection is necessary to carry out the intent of the regulatory provisions, and, second, if no additional expense appears necessary, whether or not the fee should be reduced. It is recommended that such an administrative study be made.

7. Expenditures for Building Inspection

a. Current Expenditures: The expenditures of the bureau of building inspection for the fiscal years of 1949-1950 and 1950-1951 and the budget for 1951-1952 are reported as follows:

	Expenditures		Budget
	1949-50	1950-51	1951-1952
Permanent salaries	$ 260,925	$ 267,495	$ 293,655
Allowance for overtime	333	328	400
Leaves and replacements	1,433	2,836	
Temporary salaries	4,268	2,711	
Contractual services	4,661	4,829	4,649
Materials and supplies	3,757	4,405	4,400
Equipment	2,116	4,416	4,030
Totals	$ 277,494	$ 287,020	$ 307,134

The increase in the budget over the previous year's expenditures is due to an increase in salaries. The number of positions remains the same.

The authors of this report believe that if the recommendations made for the curtailment of office hours for field inspectors and the strengthening of field supervision are made effective, the annual expenditures of the bureau could eventually be reduced by approximately $18,000, not only without any reduction in the caliber of service rendered by the department but with an increase in the effectiveness of the service. This saving can be realized either by reductions in personnel or by providing extra inspector time to reduce the backlog of work, particularly in the electrical division, or in extending the regulatory service to promote public safety.

b. Expenditure Records: It has been noted at several points in this chapter that the cost of certain regulatory services could not be determined accurately and that consequently it is impossible to determine the adequacy of the fees to cover the expense of conducting the regulatory work. It is believed to be essential to the good management of the bureau that expenditures be reported in such a way that the cost of each regulatory service can be known currently and for each year.

It is recommended in another section of this report that the reporting system be revised to show the time and expense of each type of activity.

CHAPTER X

CENTRAL PERMIT SERVICE

1. Introduction

Prior to 1932, building, building equipment, and street use permits (hereinafter referred to as building and street use permits) were issued by the various city departments and bureaus concerned. In order to provide a better and coordinated service to the public, the reorganization in connection with the new charter established a central permit bureau, in 1932, to handle in one place the receiving of applications for building and street use permits and the issuing of such permits after approval by the technical departments or bureaus concerned. At the same time, the function of central cash receiving for the department of public works was placed in this new bureau. Since then, the functions of the central permit bureau have remained unchanged.

Expenditures of the central permit bureau for the fiscal year 1950-1951 amounted to $36,129.

2. Functions and Activities

The functions and activities of the central permit bureau may be summarized as follows:

(1) Receiving applications and plans for building and street use permits as specified by ordinance.

(2) Arranging for consideration of applications (and plans and specifications that require approval of the departments and bureaus) by interested city and county agencies.

(3) Upon request, following up on the progress of the permit applications through the departments and bureaus to which they have been referred.

(4) Issuing permits after departmental approval is obtained, and collecting the fees therefor as fixed by law.

(5) In conjunction with the controller and the departments concerned, examining the cost of regulation and inspection and proposing rates to be fixed therefor by ordinance. (Not now performed).

(6) Upon the receipt of a deposit, issuing plans for public construction to contractors.

(7) Preparing periodic reports on building permits issued for use by private and governmental agencies.

(8) Posting inspection notices indicating right of appeal on construction projects.

(9) Maintaining house numbering records for the city and county.

(10) Maintaining a file of old plans for which permits have been issued.

(11) Issuing certificates of occupancy.

(12) Serving as central cashier for the department of public works.

3. Organization and Staff

a. Organization Structure: The bureau is headed by a supervisor, a civil service employe, who is appointed by the director of public works and is responsible to the assistant director of public works for administration. The plan of organization of the central permit bureau is shown in the following tabulation:

Name of Unit	Title of Head of Unit	No. of Positions	Annual Payroll Cost
Central permit bureau	Supervisor	1	$ 5,820
Secretary	General clerk - stenographer	1	3,420
General office	Senior clerk	7	23,520
House numbering	Senior clerk	1	4,200
Electrical inspection bureau cashier	Cashier	1	4,080
Totals		11	$41,040

No assistant supervisor has been officially designated in the organization although the senior clerk in charge of the general office unit actually serves in this capacity.

The cashier of the bureau is attached to the electrical inspection division of the bureau of building inspection, and in fact, this cashier works in the electrical inspection division office. This organization arrangement results from a carry-over of certain permit work formerly handled by the department of electricity.

b. Comments on the Present Organization Plan: The 1932 program of centralizing the receiving of applications for and the issuing of building and street use permits has resulted in improved service to the public. The central operation can provide a continued source of information as to the public's reaction to a substantial number of policies and procedures of the department of public works, and of a number of other departments. While the supervisor of the central permit bureau reports directly to the assistant director in charge of administration, it is believed there has been some lack of recognition, both by the bureau head and public works management, of the importance of the public relations aspect of the permit work. The place of the central permit bureau in the proposed organization of the department is discussed elsewhere in this report.

Because of the small number of employes in the bureau, the variety of clerical tasks to be performed, and the need for servicing a rather busy public counter, the present plan of having one general office section for the bureau is satisfactory. The office stenographer and the senior clerk responsible for house number records could well be included in this unit, and the field work of posting inspection notices could be handled by the house numbering clerk. This expanded general office section should be under the direction of a head clerk who would act for the supervisor of the central permit bureau in the latter's absence.

There seems to be no sound reason for leaving the cashier in the electrical inspection division of the bureau of building inspection. She can perform the same work as efficiently in the general office section of the permit bureau and could help to spread the workload in this bureau as well as to handle the bureau's cash drawer.

It is recommended that the indicated organization changes be effected without delay.

c. The Staff of the Bureau: The regular staff of the bureau as of October 15, 1951, and the cost of personal services for the permit and cashier work are shown in the following tabulation:

Position	No. of Positions	Monthly Rate of Pay	Annual Cost
Supervisor, central permit bureau	1	$485	$ 5,820
General clerk - stenographer	1	285	3,420
Senior clerk - general office unit	1	350	4,200
General clerk - typist	5	265-285	16,620
General clerk	1	225	2,700
Senior clerk	1	350	4,200
Cashier - electrical inspection bureau	1	340	4,080
Totals	11		$41,040

The ordinance establishing the central permit bureau obviously provided for a strong coordinating unit to insure that permit work would be handled expeditiously and equitably for the general public. This objective in some respects has not been attained, primarily because the permit bureau staff has not been aggressive in promoting policies and procedures which will provide a maximum effectiveness of the central operation. For example, the permit ordinance specifies that the controller, in conjunction with the central permit bureau and the departments concerned, shall examine the cost of regulation and inspection and propose rates to be fixed therefor by ordinance. According to the bureau supervisor, no such joint investigations have been made, nor has the bureau urged such highly desirable investigations. It is recommended that provision be made for such joint investigations. Again, the permit ordinance prescribes regular joint meetings of the departments concerned with permit matters for the purpose of conferring with applicants as to details of plans and specifications requiring alteration. No such meetings are held. Certainly such a procedure, particularly if representatives of the bureau of engineering and the central permit bureau were to attend such meetings, would be of considerable value to the public and would expedite the work of the central permit bureau. Yet the bureau has never promoted such meetings. It is recommended that arrangements be made for such meetings. Other examples of the failure of the staff of the bureau to perform its coordinating function to best advantage are discussed in the section dealing with bureau procedures.

The central permit bureau is definitely not understaffed at the present time. It seems quite likely that the volume of permit work in the next several years will be somewhat less than in the recent past. If the next few months of experience show that the volume of permit work is decreasing, the bureau staff should be reduced by one employe.

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4. Permit and Cashier Procedures

a. General Statement: The work of the central permit bureau falls into three broad categories:

(1) Processing applications for building and street use permits and handling related matters (the principal work of the bureau).

(2) Serving as a central cashier for the department.

(3) Handling such miscellaneous matters as maintaining house numbering records and storing plans and specifications.

Aspects of these three categories of work in which the need for improvement is evident will be discussed in subsequent paragraphs.

b. Type and Number of Permits Issued: The type and number of permits issued by the central permit bureau for the fiscal years 1948-49, 1949-50, and 1950-51 are shown in the following table:

Type of Permit	No. of Permits Issued 1948-49	1949-50	1950-51
Buildings	7,767	8,896	8,808
Billboards	234	444	130
Boiler installations	213	190	182
Boiler inspections	684	1,370	1,023
House moving	105	86	91
Demolitions	113	112	153
Flue registrations	47	49	45
Flue permits - new buildings	46	36	45
Blue permits - old buildings	107	115	71
Flue coupon books - new buildings	84	79	90
Flue coupon books - old buildings	22	18	11
Sidewalk construction	43	15	16
Street space	1,262	1,395	1,210
Excavations	1,037	1,132	1,095
Side sewers	934	898	896

(Contd.)

Type of Permit	No. of Permits Issued 1948-49	 1949-50	 1950-51
Sidewalk flower markets	37	36	44
Blasting	7	6	5
Advertising	17	36	23
House number certificates	1,331	1,423	1,397
Public utilities street openings	8,171	9,317	9,464

In each instance a permit application follows a fixed routing for approval by interested agencies as specified by ordinance. Other than the central permit bureau itself, as many as five agencies may be concerned in the issuance of a permit. In view of the substantial volume of work involved, it is evident that a sound control mechanism must be developed if the permit procedure is to work smoothly and satisfactorily.

c. Control of In-Process Applications for Permits: After a permit application (with plans and specifications, if required) is received by the central permit bureau and control information is entered on a daily record register and an individual record card, the application follows a standard routing to interested agencies, depending upon the type of application involved. However, once the application leaves the bureau, the bureau has no follow-up control of the application. The result is, that when an inquiry is made as to the status of the application for most classes of permits, the bureau can only reply that it is in process in some agency. If the person making the inquiry asks for an additional check, the bureau must call each agency involved in the standard routing of the application and each agency must check its records or inspect the in-process work which may be handled by one of a number of employes. In view of the volume of work and the number of individuals involved, the present control procedure is not satisfactory. It is possible to set up a simple control procedure based on a preprinted routing form with perforated segments. This form would be attached to the permit application prior to routing. As the application was approved in each agency, the appropriate segment would be torn off, and routed to the central permit bureau. That bureau would file the segments by application number. Reference to this file would show readily the location of any permit application and provide better service to the public. It is recognized that this procedure would require perhaps one-half of an employe's time. However, the saving in time of the bureau's and other agencies' employes involved in the permit operations would more than compensate for the costs of the proposed procedure. It is recommended that such a procedure be adopted.

d. Certificates of Occupancy: By ordinance, certificates of occupancy must be issued by the city and county in the case of the construction and reconstruction of dwellings having more than two family units, and of commercial buildings. The approval of four agencies (health, fire, building inspection, and planning) is required before the certificate can be issued by the central permit bureau. The purpose of this procedure is to

provide a final clearance from all principal agencies concerned, certifying that construction rules and regulations have been observed.

The certificate of occupancy procedure prescribed by ordinance is not being followed. The authors of this report reviewed a hundred or more final clearances that had just been received by the central permit bureau from the building inspection bureau which were three or four years old. According to law, the central permit bureau would then issue certificates of occupancy on buildings which had already been occupied three or four years after construction or reconstruction was completed. The bureau supervisor, when asked what action he would take on the very old final clearances he had just received, replied that he would not issue the certificates as the city and county would appear ridiculous if he did so.

The section of the ordinance dealing with certificates of occupancy should either be repealed or made effective. It would appear that there might now be a basis for serious legal controversy on at least two counts, because of the failure to issue currently certificates of occupancy, as prescribed by law. The first is that, in the event of structural failure in a building, the city and county might well be held to be liable. The second is that legal questions might be raised as to the validity of occupancy in the event of sale of the building perhaps years later. It is recommended, therefore, that the public works management examine, without delay, the certificate of occupancy procedure and determine whether it will be made effective.

e. Side Sewer Procedure: Upon application, city and county forces make side sewer installations (lateral connections with main sewers under city streets). A minimum deposit of $125 is required with the application for construction of a side sewer. Either a refund or an additional billing is made, depending upon the actual side sewer cost. Due to cost increases in recent months, a great many of the installations are costing more than the deposit amount. The bureau is considering recommending an increase in the amount of the minimum deposit, and this increase would appear to be justified and is recommended.

f. Cash Receiving Procedures: The bureau receives all moneys for the department of public works as well as the fees collected by the central permit bureau itself. Deposits are made daily with the treasurer.

A rather elaborate procedure is utilized for deposit authorization for the department's miscellaneous deposits (i.e. all department receipts except central permit bureau receipts). The bureau supervisor who serves as central department cashier receives what are called "director's orders" which authorize him to deposit these funds. Each director's order is typewritten on legal-sized paper using standard language. A form could replace the typewritten order and it is recommended that such a procedure be followed.

There is need for greater control over permit forms in the cashiering operations. The permit form books are not issued and controlled by the office of the controller but are printed by an outside printing company on bureau requisition to the purchasing department. While the office of the

controller has a record of permit book numbers, it would be possible for an employe to use an unauthorized permit book and not account for money collected at the time the permit was issued. It is recommended that consideration be given to setting up a control over the issuance of permit books to the central permit bureau by the office of the controller.

g. Building Plans and Specifications: Building plans and specifications accompanying permit applications are held for a time by the building inspection bureau and then turned over to the central permit bureau for filing. Over the years there has been a large accumulation of this material in the city hall basement storage room of the bureau. A systematic program for destroying these old plans and specifications should be initiated. The bureau has recognized this need, and it is recommended that the building inspection bureau develop a procedure for disposing of these records.

h. Vehicle for Field Work: One 1947 Ford coupe is assigned to the central permit bureau for its field posting and house numbering work. This is necessary work and a vehicle is required.

5. Expenditures for Central Permit Operations

a. Current Expenditures: The expenditures of the central permit bureau for the fiscal years 1949-1950 and 1950-1951 and the budget for 1951-1952 are reported as follows:

	Expenditures		Budget
	1949-50	1950-51	1951-52
Personal Services	$31,571	$35,304	$41,155
Contractual services	162	238	137
Material and supplies	39	130	70
Services to other departments	-	-	50
Equipment	282	487	525
Totals	$32,054	$36,129	$41,937

b. Expenditure Requirements: No immediate changes in expenditure requirements of the central permit bureau are proposed other than providing for the position of head clerk rather than senior clerk to head the general office section and to serve as acting supervisor of the bureau in the absence of the supervisor. Actually, if the recommendations proposed in this chapter are placed in effect there will be some reduction in expenditures for the overall permit procedures of the various city and county agencies concerned.

CHAPTER XI

PUBLIC WORKS ACCOUNTING

1. Introduction

This part of the report deals with accounting operations as performed by the bureau of accounts. The primary objective of the accounting study was to compare the existing organization and procedures with those necessary to produce adequate financial information for the purposes of operating management of the department. Consideration of the policies and procedures of city-wide financial or purchasing administration was not included in the scope of this public works study, and only general comment is made on these subjects in this report.

Prior to 1923, public works accounting functions were performed in a bookkeeping unit under the direction of a head bookkeeper. This unit was reorganized in 1923 and raised to bureau status and was placed under the direction of a supervisor of accounts. The functions of the bureau over the intervening years have expanded somewhat, particularly in the accounting for state subventions in public works activities.

Expenditures of the bureau of accounts for the fiscal year 1950-51 amounted to $111,558. This amount includes accounting services not budgeted for in the bureau of accounts but which are included in the budgets of the maintenance bureaus.

2. Functions and Activities

The bureau of accounts maintains the basic accounting records and handles material requisitioning and general stores matters for the department. Specifically, the bureau is responsible for conducting the following activities:

(1) Maintaining books of account of general, special, trust, and bond funds, and preparing reports as required from these records.

(2) Preparing cost records for general fund and interdepartmental work orders and accounts (hereinafter referred to as work orders) and automotive equipment, and preparing monthly and annual cost reports.

(3) Maintaining side sewer job and refund accounts.

(4) Maintaining budgetary controls of transactions of all bureaus and reconciling records with the controller as required.

(5) Performing timekeeping and preliminary payroll work, maintaining auxiliary payroll records, and delivering pay warrants to employes on the job for the maintenance bureaus.

(6) Preparing requisitions for transmittal to the purchasing department, reconciling material received with purchase orders, and maintaining inventory records of materials in stores.

(7) Operating the $90,000 stores revolving account used for the purchase in advance of frequently used materials.

(8) Operating a small central stationery stores for the department.

(9) Providing general clerical and typing help to the bureaus of streets, street cleaning, sewers, and building repair.

(10) Operating the department cash revolving fund of $1,500 used for the payment of small bills and transportation charges.

(11) Assembling approved budget estimates of the department and supplying supporting statistical data.

(12) Operating the public works yard switchboard.

3. Organization and Staff

a. Organization Structure: The bureau is headed by a supervisor of accounts, a civil service employe, who is appointed by the director of public works and is responsible to the assistant director of public works for administration. The plan of organization of the bureau is shown in the following tabulation:

Name of Unit	Title of Head of Unit	No. of Positions	Annual Payroll Cost
Bureau of accounts	Supervisor of accounts	1	$ 6,600
Public works yard accounting	Head clerk	12	41,100
Purchase and stores	Head clerk	3	11,040
City hall accounts	General clerk	2	6,120
City hall payroll	Senior clerk	3	10,740
Public works yard payroll	Senior clerk	5	18,300
Operating bureau's records	General clerk - typist [1] General clerk - payroll [1]	2 3	16,860
Totals		31	$110,760

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[1] Accounting employes assigned full time to operating bureaus.

The organization for accounting falls basically into two separate groups - the public works yard division which handles accounting and stores matters for the maintenance bureaus and the city hall division which is concerned with all other departmental accounting matters. There is no assistant supervisor in the organization although the head clerk in charge of public works yard accounting is often identified as the assistant and actually does serve in this capacity on many matters.

There is some difficulty in determining the exact status of the five employes of the bureau of accounts assigned on a full time basis to other bureaus. In each instance the employe is concerned with matters directly relating to the bureau to which he is assigned although the supervisor of accounts exercises some directional responsibility over each of these employes.

b. Comments on the Present Organization Plan: The organization plan for public works accounting lacks the cohesiveness necessary for effective operation. This is due in substantial part to the fact that it has been considered necessary to separate the two accounting groups physically. As a result, the supervisor of accounts generally spends the morning of each working day at the public works yard and the afternoon at the city hall, and he assumes direct responsibility for the city hall accounting activities. It is argued that, to provide the most effective service to the department, it is necessary to continue performing the department's accounting work in two separate locations. This argument is not convincing in that (1) the

department's operations are not confined to the city hall and the public works yard and procedures can readily be established to have necessary accounting source data flow into one central point, (2) there could be more effective utilization of staff if the accounting work were combined in one location, and (3) more effective management reporting (as discussed in a later section of this chapter) will reduce the need for on-the-spot reference to the books of account now maintained at the city hall. As ample space and facilities are available in the new public works yard office building, it is recommended, therefore, that all accounting operations for the department be performed in that location.

The organization for accounting even at the public works yard, where most of the employes are located, is unduly split up into small specialized functions and activities with most employes reporting directly to the head of the bureau and/or the head accounting clerk of the public works yard. As a result, the individual second level employes do not understand the overall requ ments for cost accounting, general accounting, and accounting reports for the department as a whole. The present organization plan for accounting should be revised to provide a sound foundation for the most effective accounting service to the department.

Employes permanently assigned to record-keeping work in the operating bureaus but who are now considered to be employes of the bureau of accounts should be transferred to the operating bureaus involved as discussed in other chapters of this report. However, the head of the accounting bureau should retain functional supervision of their activities so that the operating bureau's records may be maintained in the best manner for ultimate processing by the bureau of accounts.

c. <u>The Staff of the Bureau</u>: The regular staff of the bureau as of October 15, 1951, and the cost of personal services for accounting is shown in the following tabulation:

Position	No. of Positions	Monthly Rate of Pay	Annual Cost
Supervisor, bureau of accounts	1	$550	$6,600
Head clerk - public works yard accounting	1	410	4,920
Bookkeeper - gen'l. accounts	1	325	3,900
General clerk	1	285	3,420
General clerk - building repair	1	285	3,420
Bookkeeper	1	265	3,180
General clerk - auto. records	1	285	3,420
General clerk - main sewers	1	265	3,180
Bookkeeper - street repairs	1	265	3,180
Bookkeeper	1	265	3,180
General clerk - street cleaning	1	275	3,300
Stenographer	1	225	2,700
Telephone operator	1	275	3,300
Head clerk - purchase and stores	1	370	4,440
General clerk	1	275	3,300
General clerk-typist	1	275	3,300
General clerk - city hall accounts	1	285	3,420
General clerk	1	225	2,700
Senior clerk - city hall payroll	1	350	4,200
Senior clerk	1	320	3,840
General clerk-typist	1	225	2,700

Position	No. of Positions	Monthly Rate of Pay	Annual Cost
Senior clerk - public works yard payroll	1	385	$ 4,620
General clerk	4	285	13,680
General clerk-typist[1]	2	265-285	6,600
General clerk-stenographer[2]	3	285	10,260
Totals	31		$110,760

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[1] Both assigned full time to operating bureaus - one to street repair, and the other to sewer repair.

[2] All assigned full time to other bureaus - one to building repair, one to street cleaning, and the other temporarily to the general office.

The necessary accounting operations in the department traditionally have been considered bookkeeping and relatively routine clerical tasks. The accounting positions have been so classified under civil service with the result that there is no accounting classification in the department other than bookkeeper." In some instances, it has been difficult if not impossible to secure supervisory employes as well-qualified as is necessary for the accounting operations of a large public works department.

The operations of the bureau have been considerably complicated by substantial employe turnover which requires training temporary people until permanent employes can be recruited. Mechanizing a large amount of the routine clerical operations, as discussed elsewhere in this chapter, will help to overcome this turnover problem.

No manual of accounting rules and procedures has been developed in the bureau. Such a manual would be of great value in indoctrinating new employes and of value to all employes for reference purposes. Such an accounting manual should be developed and maintained on a current basis.

d. The Proposed Organization of the Bureau: The proposed plan of organization for the bureau of accounting and finance affords the means of correcting certain difficulties previously described, in the bureau of accounts and of integrating the accounting work of the department. The suggested subdivision of the bureau into sections, the proposed names of these organization units, and the proposed titles of supervisory personnel are indicated in the following tabulation:

Name of Organization Unit	Title of Head
Bureau of accounting and finance	Director of accounting and finance
General accounting and budgeting section	Chief accountant
Cost accounting section	Chief cost accountant
Internal audit section	Chief auditor
Machine services section	Tabulating supervisor

It will be noted that changes are proposed for the names of units and for the title of supervisors. The proposed titles are for administrative purposes and indicate the importance that the authors of this report ascribe to the need for establishing supervisory positions with commensurate rates of pay for the important accounting tasks involved.

The general functions to be assigned to each of the proposed organization units are as follows:

(1) General Accounting and Budget Section: Assign to this section the functions of maintaining the general accounts of the department, preparing general accounting reports as required, preparing the department's annual budget requests by coordinating estimates of the bureaus as to requirements with an overall program reflecting top administrative policy, and maintaining budget control. The chief accountant should act for the director of accounting and finance in the latter's absence.

(2) Cost Accounting Section: Assign to this section the functions of coding and otherwise preparing basic data for processing by punched card machines, of working closely with the operating bureaus to determine the kind and type of cost reports that will best meet the department's needs, and of preparing in the best and most usable form cost reports for the department and the office of the controller.

(3) Internal Audit Section: Assign to this section the functions of pre-auditing all documents evidencing commitments, expenditures, receivables, and receipts including payroll, stores documents, vouchers, and invoices. As part of its work, this section will handle all functions now performed by the present stores and payroll units, and would make spot audits of the proposed time-keeping procedure as discussed elsewhere in this chapter.

(4) Machine Service Section: Assign to this section the function of operating the proposed punched card accounting machine installation, other office machines such as duplicating machines, and the public works yard switchboard.

4. Procedures for Accounting

a. General Statement: There are some problems of accounting procedures that are met in all branches of the department. These general procedures will be discussed here, leaving those that deal with a particular function such as street cleaning, sewers, or street repairs, to be discussed elsewhere in the report. The general procedures deemed to be adequate will be given only passing attention, and the discussion will concern mainly those that can be improved.

b. Payroll Accounting: Payroll and labor reconciliation is now being done effectively but it is possible to improve the procedure with some saving in cost. Employes of the maintenance bureaus fill out individual daily time tickets accounting for the number of hours worked during a day, by work order. Further, each foreman prepares a daily time report listing essentially the same information for each man under his supervision in addition to material, performance, and other data. Three timekeepers cover the entire city collecting the daily time tickets of the previous day from the individual employes on the job. The daily time tickets are reconciled with the daily time reports by the bureau of accounts.

Actually the term "timekeeper" is a misnomer, in that the timekeepers are not concerned with making certain that employes stay on the job during the entire day. Only the foreman or supervisor can provide necessary attendance supervision. It is believed, therefore, that a revised daily time report should be prepared by each foreman or supervisor for himself and the members of his crew which will form the basis of the payroll records and the distribution of labor to work orders. The present daily time ticket filled out by each employe should be eliminated. The foreman is the only dependable source of attendance information when it is not practicable to utilize time clocks or timekeepers to ensure that employes stay on the job during the entire day. This has been recognized in many city public works departments throughout the country. The recommended procedure for controlling attendance time for the maintenance bureaus may be briefly summarized as follows:

(1) Vest the responsibility for keeping and reporting time, both in total and by work order, in each foreman.

(2) Issue a daily time report to each foreman which, when completed with attendance data and material and other information (as is now being entered on applicable daily time reports), will be transmitted through proper channels to the bureau of accounts.

(3) Require that the foreman execute a simply-worded certificate attesting to the accuracy of the entries on each daily time report.

(4) Provide that the proposed internal audit section of the bureau of accounts make occasional test checks of the time reports in process of preparation during the working day.

(5) Utilize the certified daily time reports as the basis for preparation of attendance records, for labor distribution to the accounts, and for material costs and other data. A saving of $8,500 would result from the adoption of this plan by eliminating three timekeepers and three automobiles but providing for adequate test checking of payroll reports.

The office of the controller prepares on punched card accounting machines preliminary payroll registers (called time rolls) and sends three registers to the bureau of accounts. The bureau of accounts completes these preliminary payrolls by hand. This work can be mechanized as part of the punched card accounting machine installation discussed elsewhere in this chapter.

c. Cost Accounting: The bureau maintains an intricate system of cost accounting records, particularly for interdepartmental work orders. Much of this procedure, prescribed by the office of the controller, could be considerably simplified. However, despite the fact that rather elaborate cost records are maintained, the objectives of the cost accounting work in providing effective management tools for the control of the department's operations on a current basis are not being attained. There appear to be two reasons for this condition. The first is that the operating bureaus have not been conscious of the need for current, usable cost data as effective management tools. The second reason is that the bureau of accounts has not taken the initiative in recommending types and kinds of cost data prepared on a current basis that might be helpful to the operating bureaus' management. This is due, primarily, to the fact that the bureau of accounts has been relegated to performing rather routine clerical operations, and the bureau and its staff have become submerged in the department's operations. Cost accounting in a large department of public works is an important task and quite comparable to cost accounting requirements in a manufacturing business. As an example, the decision as to what public works can be most efficiently done by city forces and what can best be done by outside contractors should be based on comprehensive and current cost data. These data can be readily provided, with no increase in cost, by improved organization and mechanization of the accounting operations.

The charter provides that there shall be separate accounting for each public work or improvement estimated to cost less than $2,000, and indirect and supervisory elements of cost shall be chargeable to such work or improvement. Actually, it is the department's policy to apply an indirect labor charge against the work order and then apply so-called overhead charges against the total direct and indirect costs, all on a percentage basis established monthly. Equipment such as trucks and air compressors used on work orders are considered as direct charges to the job and are charged at arbitrary fixed rates. The various factors considered in these indirect labor and overhead charges are as follows:

Indirect Labor	Overhead
One-half of general foreman's time	Vacation
Proration of shop men's time worked on jobs	Sick leave
Bureau of accounts employes directly concerned in work	Workmen's compensation
	Retirement [1]
	Miscellaneous (shop tools, etc.)

The allocation of overhead burden to work orders is a sensible cost accounting procedure. However, to obtain even more realistic costs, it is desirable that some additional burden factors be allocated. Specifically, it is believed that all bureau of accounts' expenditures should be included in the burden allocation to work orders and accounts as well as the salaries of all supervisory personnel in the department. This applies not only to interdepartmental work orders but general fund accounts as well. Further, in the operation of a specific activity, such as the asphalt plant, it is reasonable to charge depreciation so that it will be possible to arrive at an accurate cost per ton of asphalt produced, and the asphalt should be charged out to jobs on that basis. Also, in the case of the asphalt plant, burden is not now directly included in the cost of operation of the plant but, instead, is lumped in the cost of each street job. Asphalt plant burden costs should be charged directly to plant operations so that it will be possible to arrive at the process cost per ton for each ton produced by the plant.

Some difficulty has been encountered in closing out interdepartmental work orders on a current basis which is highly desirable from the viewpoint of public works management. The difficulty is traceable in large part to the complicated work order procedure established by the office of the controller, discussed elsewhere in this chapter. For example, in these days of material scarcities there may be a long delay in obtaining a specific item of material required for a work order. Months may pass before the material item is received and the work order can be closed out. Also, in the case of school repair work orders, there have been instances where a great many individual repair jobs are included by the office of the controller in one overriding work order number. Until all of these jobs are completed, the overriding work order cannot be closed out, thus delaying the assembly of current, usable cost date.

d. <u>General Accounting</u>: A manual record of appropriations, receipts, transfers, encumbrances, and expenditures is maintained by the bureau of accounts for the following funds:

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[1] In the case of interdepartmental work orders.

Special gas tax fund

Special road fund

State highway trust fund

General fund - department
of public works

Interdepartmental - general fund
(public works contracts)

1948 school bond fund

1947 street improvement bond fund

1948 sewage treatment bond fund

1944 sewer bond fund

1944-1948 juvenile court bond fund

Various maintenance funds by object of
expenditure

These records in some instances are not maintained in such form that general accounting information can be readily drawn off on a current basis. Two examples of this condition are given. General fund expenditures for the last half of the fiscal year ending June 30, 1951 had not been totaled by budget account classification in November, 1951. Further, to obtain interdepartmental expenditures for those operating bureaus handling interdepartmental matters so that total expenditures for each bureau could be determined, the authors of this report were forced to go to monthly summary working papers, extract and analyze the information, and total the results. A critical review of the method of keeping the general books of account should be made in order that such situations may be remedied.

It is necessary that fund accounting work continue to be retained in the department for operating purposes and for reports to the state on subvention funds by the bureau, despite some duplication of these records with those maintained by the office of the controller. The fund accounting work in the bureau could be performed on the punched card accounting machines whose installation has been recommended elsewhere in this part of the report, after other aspects of accounting have been mechanized.

e. Management Reports: It is believed that the most important change needed in connection with the department's accounting system is the recognition by top administrators of the end use to which the accounting information that might be produced could be put. There is a vital need for recognition that analytical accounting information is a most valuable tool of management, and

that the scope of the accounting office function extends far beyond a mere bookkeeping operation. For example, one accounting employe's time is devoted to the assembly of automotive cost and operation data, and a monthly report is prepared for operating management which presumably represents only a summation of mileage data and not a report of individual vehicle operations. Actually the procedure is deficient in that some essential data are not recorded and valuable data that are accumulated are never used. Yet comprehensive and accurate automotive data are needed, and needed badly, by the operating bureaus.

Other monthly reports are prepared by the bureau of accounts for the operating bureaus. They are not well adapted to administrative purposes and are often two months late. They serve little purpose other than providing some more or less current statistical information and forming a basis for the department's annual report. It is believed that the director of the department and the assistant director for maintenance and operation should insist that cost and other accounting information in the form of usable management reports be provided on time by the bureau of accounts and be used intelligently by the operating bureaus.

f. Materials and Stores Procedures: A substantial volume of transactions is performed in requisitioning material for department operations from the purchasing department and in reconciling material received with purchase orders as shown in the following table for the fiscal year 1950-1951:

Transactions	No. of Transactions
Requisitions for purchase orders (including 180 emergency purchase orders)	3,760
Delivery orders (against standing purchase orders)	6,364
Requisitions on storeroom, yard, and central warehouse (revolving fund material)	9,151

Material is obtained for the department's operations either through a requisition for direct purchase, or a requisition for frequently used materials, stocked by the purchasing department, through the $90,000 stores revolving account of the department. The relationship between the department and the purchasing department is discussed briefly elsewhere in this part of the report.

Purchased material is received by the general foreman who requisitioned the material and it is his responsibility to ascertain that purchase descriptions and specifications have been complied with by the vendor by inspection of the material and check against a copy of the purchase order. The department rarely tests, or causes to be tested, any material procured. It seems evident that a more formal inspection practice and requirements procedure is necessary, and it is recommended that the department undertake a study to determine the simplest and most effective procedure that can be developed in conjunction with the internal audit work of the bureau of accounts.

It is the policy of the department to approve and transmit to the office of the controller, invoices and corresponding receiving records as quickly as practicable, where cash discounts for prompt payment are involved. This procedure appears to be working satisfactorily, and is being handled centrally by the purchases and stores unit.

5. Accounting Equipment and Facilities

a. Office Machines: Nearly all posting work in the bureau of accounts is done by hand. The principal office machines of the bureau are in the public works yard office and consist of 10 new calculators and 15 adding machines (most of which are also new) to facilitate computation work and hand posting. Visible card records are extensively used in a number of accounting operations.

In view of the volume of record-keeping operations required in the department and the need for more extensive and improved operating management reports, punched card accounting machines could be utilized to great advantage in handling the bulk of the routine accounting work. The installation of these machines would help to solve a number of the problems that have been plaguing the bureau as discussed elsewhere in this chapter.

The following applications can be placed on the punched card machines to advantage over a period of several years:

1. Labor distribution to work orders and accounts

2. Material distribution to work orders and accounts

3. Overhead distribution to work orders and accounts

4. Periodic work order and account cost reports

5. Periodic cost reports by operation, irrespective of work order, i.e., curb costs, sewer costs, etc.

6. Preliminary payroll, and reconciliation with labor distribution

7. Equipment costs and reports

8. General ledger accounting and detailed reports from such records.

The costs of operating such a punched card machine system must be recognized. Provision must be made for necessary coding and other preparatory work before the basic data can be released to the proposed machine services section, and for review and, in certain instances, for interpretation of the machine reports. A substantial machine rental cost is involved, and a specialized staff must be recruited and trained to operate the machines. With full recognition of all of these expenses, it is believed that there will be no increase over present accounting costs and possibly some actual cost saving. Further, the punched card machines can provide the accounting information on a current basis that is needed, as indicated elsewhere in this report,

and which could be provided under the present system only by adding some additional accounting employes.

There is doubt as to the availability of punched card accounting machines in the immediate future. However, it is likely that it will be possible to obtain the basic machines in six months' to a year's time. Under any circumstances the department should make the decision to install the machines, and necessary funds should be provided in the new budget.

Ample quarters have been provided for the bureau of accounts in one wing of the new public works yard building. Space is available in this office for those employes now stationed at the city, as well as for the proposed machine services division. Other office equipment is adequate.

The bureau of accounts has three vehicles assigned to it for timekeeping purposes: 1 Chevrolet 1947 coupe, 1 Ford 1947 coupe, and 1 Chevrolet 1949 coupe. No vehicles will be required by the bureau for the timekeeping procedures proposed in this report.

6. Relationships with the Office of the Controller and the Purchasing Department.

a. General Statement: Policies and procedures of the office of the controller and the purchasing department were not included in the scope of this report. However, several matters of considerable importance to the department of public works in its relationship with these departments should be mentioned in this report.

b. Accounting for Interdepartmental Building Repairs: It is suggested that the method of accounting for building repair work orders for the city and county as a whole could be considerably simplified. On the majority of these work orders an extremely detailed procedure is followed which appears to be not only expensive but bulky and time consuming. It is recommended that the office of the controller and the department of public works jointly review this procedure with the view of simplifying it.

c. Purchasing Procedure: It is reported that an average period of six weeks elapses from the time a purchase requisition leaves the department of public works until a copy of the purchase order is received from the purchasing department. There appears to be little reason for the delay and the reason for it should be investigated.

The sub-storeroom of the corporation yard and the Harrison pipe yard are considered to be under the cognizance and supervision of the purchasing department. An employe of the purchasing department is assigned full time to the sub-storeroom, yet an employe of the department of public works handles the pipe stores at the Harrison yard on a full-time basis. If the established policy of storeroom supervision by the purchasing department is to be followed consistently, that department should take over the management of pipe stores at the Harrison yard.

7. Expenditures for Accounting and Stores

a. Current Expenditures: The expenditures of the bureau of accounts for the fiscal year 1950-1951 and the budget for 1951-1952 are reported as follows:

Item	Expenditures 1950-51	Budget 1951-52
Permanent salaries	$110,848	$110,905
Allowance for overtime	290	250
Holidays	197	290
Temporary salaries	109	200
Materials and supplies	114	150
Totals	$111,558	$111,795

Through the fiscal year 1950-51 the department followed the practice of showing as accounting expenditures only the salaries of those employes who presumably were not connected in any way with interdepartmental record-keeping or accounting. Thus in 1950-51 out of a total of $110,848 for permanent salaries, only $43,092 was shown as a bureau of accounts expenditure. Information as to the total accounting expenditures could be obtained only by adding the salary charges for interdepartmental accounting work in the 24 semi-monthly payrolls for the year and then adding the budget expenditures. The 1951-52 budget shows some change in procedure, in that additional employe salaries are included in bureau of accounts budgets, but there is still some $24,000 of salaries which are buried in the budget accounts of the maintenance bureaus. It is recommended that all accounting items be classified in the bureau of accounts budget under proper headings, except the salaries of those employes who are transferred to the operating bureaus from the accounting bureau, as proposed elsewhere in this chapter.

b. Expenditure Requirements: As discussed previously, the true amount of expenditures for accounting in its broadest sense has been obscured because of the practice of burying a substantial portion of the accounting expense in the budgets of other bureaus. Even so, the present overall accounting expenditures are not out of line for the size of the department. It has been recommended elsewhere in this chapter that the accounting staff needs considerable strengthening with reclassification and pay increases for a number of positions. Even in view of this recommended increase in expenditure requirements, it is believed that, by mechanizing a substantial percentage of the accounting operations, changing the attendance procedures, and centralizing all accounting operations at the public works yard, it will be possible to reduce accounting expenditures by at least $8,500 a year and to provide a much more effective accounting operation for the department. Other savings, less tangible in character, will result from the adoption of the recommendations made in this chapter.

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CHAPTER XII

MANAGEMENT OF PUBLIC WORKS EQUIPMENT

1. Introduction

The department of public works necessarily needs and uses a large amount of equipment in connection with the maintenance of streets, sewers, and buildings, the cleaning of streets, and the administration of engineering and other department services. Actually 284 vehicles or machines are used by the department.

The equipment is not well managed at the present time, partly because the department has not given sufficient attention to creating a positive plan of administration and maintenance, and partly because the city policies regarding acquisition, retirement, and replacement of equipment have not kept pace with the accepted practices in motor vehicle fleet management. The whole problem of equipment management should be thoroughly reviewed and sound policies and procedures adopted. The general aspects of the present arrangement will be discussed in this chapter and a proposed plan for administrating the equipment will be presented.

Before the 1931 charter changes went into effect, the equipment of the department was acquired and administered by the board of public works. Under the new charter, the responsibility for purchasing equipment and for operating the central shops for the repair of equipment was placed in the purchasing department. The division of the work and responsibility between the two departments was not clearly defined, and even now some confusion remains. In consequence, the administration of the equipment service has suffered.

Some of the matters discussed in this chapter have been mentioned in the preceding chapters in connection with particular department services. They are repeated here in order to summarize in one place, all problems related to the administration of equipment.

The need for sound administration and control of public works equipment has been met by many metropolitan cities by adopting a system of management that combines the main elements of the scheme of equipment administration, used by private fleet owners, with the peculiar needs and

restrictions of municipal government. The plans that have been adopted by numerous cities are essentially the same as that proposed in this report. New York, Chicago, Milwaukee, Minneapolis, Cincinnati, Louisville, Baltimore, and Flint, for example, have instituted positive equipment management programs.

2. The Equipment of the Department

A large number of automobiles, trucks, and maintenance machines are used by the department in the conduct of its regular activities. As of August 15, 1951, 82 passenger vehicles, 127 trucks, and 26 pieces of maintenance machinery, owned by the city were in use by the department. In addition, 34 vehicles were hired full time for department use, and 15 private automobiles of department employes were in use on department work. The equipment used by the department is enumerated in the following tabulation:

Name of Unit	Passenger Autos	Trucks				Machinery		Total City-Owned Equip.	Privately owned a/ Vehicles	Rented or Leased b/ Vehicles
		Pickup	Dump	Flat Bed	Special	Auto-motive	Not Self-Propelled			
Office of the director	3							3		
Bureau of engineering	15	3	2					20	14	8
Bureau of architecture	2							2	1	
Bureau of street repair	6	5	23	2	3	6	11	56		8
Bureau of building repair	11	4	2	11		8		36		6
Bureau of street cleaning	5		35	3	18			61		1
Bureau of sewer repair	7				16	1		24		11
Bureau of building inspection	29							29		
Central permit bureau	1							1		
Bureau of accounts	3							3		
Totals	82	12	62	16	37	15	11	235	15	34

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a/ Privately owned vehicles are automobiles of employes.

b/ Rented vehicles in bureau of engineering are automobiles.
Rented vehicles in other bureaus are trucks.

3. Present Arrangements for Equipment Management

a. Acquisition of Equipment: Equipment for the public works department is bought through the regular purchasing system of the city, after the acquisition has been approved by the inclusion of specific equipment items in the unit budgets of the department as they are passed by the board of supervisors. Original requests for new equipment are made by using agencies at the time the regular annual budgets are prepared, and a justification statement usually accompanies the request. During the budget reviews and hearings by the director of public works, the chief administrative officer, the mayor, and the board, equipment items may be eliminated or the requested number of equipment items may be reduced. It is reported that requests for equipment are pared drastically during the several stages of budget review, partly to reduce the total appropriations, and partly because the actual need for the equipment is questioned. The fact that equipment requests are frequently disallowed demonstrates the lack of effective policies for equipment acquisition.

One of the fundamental reasons that budget requests are denied is that the using agencies fail to demonstrate conclusively their need for the equipment requested and to prove, as often it can be proved, that the purchase of certain equipment or the replacement of equipment will actually save money for the city. Instead, faced by heavy slashes in previous requests, the units tend to ask for much more equipment than is necessary, with the expectation of having the requests reduced, and the hope that the proper amount will be approved. Budget authorities soon lose confidence in the propriety of the requests, and tend to trust to their own judgment, which is without validity unless it is based on a factual study of operations and equipment costs. The result is a virtual breakdown of proper budgetary procedure. The remedy is to insist on the development of factual proof of equipment needs, subject to review and check by the budget review officials. A firm policy with regard to equipment acquisition and replacement should be established.

During the course of this study employes frequently said that the decision as to the type of equipment supplied is made by the purchasing department rather than by the agency using the equipment, and that often the cheapest equipment is acquired rather than that most effective for the work that has to be done. Specifications for special equipment are developed and submitted with the requisitions, but they are apparently often developed without sufficient study of needs or of the suitability and relative performance of the equipment available. It is reported also that the specifications submitted are sometimes changed by the purchasing department. It would seem that greater attention to specifications, preferably by both operations and equipment specialists, would help to insure the acquisition of suitable equipment. The way to combat a tendency to buy cheap equipment is to analyze the unit costs of performing the required work by the several items of equipment being considered. Unfortunately, good cost data are not now available, but it has been pointed out in several preceding chapters how they can be secured.

b. Responsibility for Equipment Maintenance: Equipment authorized in the budgets is acquired for use by the particular agency designated and is received by the agency in the same manner as other material or supplies. To all intents and purposes, equipment is owned by the agencies for which it was purchased, and presumably each agency is completely responsible for the custody and care of the equipment provided. The using agency jealously guards the right to utilize the equipment as it sees fit, and any attempt to divert equipment to other uses, or to borrow it for other agencies, is resisted strongly. The using agencies should have an equally strong desire to maintain the equipment in such a manner as to keep it in good operating condition and to secure full use from it. Actually, there is considerable concern in several of the largest equipment using agencies that the equipment is not cared for properly, but there is a general feeling that the operating bureaus can do little about this and that the responsibility lies in the purchasing department.

It is reported that the repair garage has, at times, resented interference from the operating units in deciding what repairs are needed and to what extent a vehicle should be reconditioned. Usually the representatives from the using agencies are not equipment experts and it is understandable that the repair officials feel that they know best what should be done, and that the city's investment in equipment should be protected. From the standpoint of the using agencies, however, there is a limited amount of money available for repair work and the maintenance work must be planned carefully. Therefore, the control of what is done must lie with the department. The city charter places the central shops under the purchaser of supplies but does not make that officer responsible for the maintenance of the equipment.

Under the present plan, conflict between the using agencies and the repair garage is inevitable, and the situation should be corrected. Either complete responsibility for the management of equipment should rest in a central municipal agency,and equipment services should be provided using agencies on a rental basis, or the responsibility for managing the equipment must be accepted by the using department which would deal with the central repair unit exactly as with a private repair garage. A recommended plan will be presented later in this chapter.

c. Repairs to Equipment: Major repairs to department equipment are carried out by the central shops of the purchasing department, and much of the minor work is also done by those shops, but a considerable amount of machine adjustment, minor part replacement, and minor repairs is handled by the chauffeurs or other department employes. Usually a repair order is issued to the central shops by the using agency concerned when a piece of equipment is sent to the shops, and charges are made monthly on interdepartment work orders. A monthly report of the work done on each vehicle is prepared by the purchasing department.

Some using agencies keep a rather close check on the work done by the repair forces and attempt to control the amount and kind of work done, while others deliver the equipment to the repair shops and permit the garage employes to do whatever is thought necessary. Neither plan works

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very well, because the liaison is usually maintained by chauffeurs who are not actually vested with much authority, and can operate only by maintaining friendly relations with the shop people, and because equipment repair budgets are often insufficient and sometimes seriously overspent. In December 1951, for example, one agency had spent its entire appropriation for the fiscal year, and other agencies had spent as much as two-thirds of the entire year's appropriation.

Frequently the chauffeur accompanies his equipment to the shops and stays with it throughout the period of the work, whether a few hours or several days. In some instances entire crews stay with vehicles or machines while they are in the shops. The two principal reasons for this practice are, first, the desire to instill in a chauffeur an enthusiastic interest in knowing his machine and in taking good care of it, and to represent the using agency in the repair shops; and, second, the lack of reserve equipment to which the chauffeur and crew could be transferred. In several chapters of this report, this practice is condemned, and without doubt it costs the city many times the expense of providing a first class equipment service. Obviously, the employes, who normally work with a piece of equipment, should be immediately transferred to other equipment or other work when the regular vehicle or machine is sent to the repair shops.

No study was made of repair shop operations, partly because the activities of the purchasing department were not included in the assignment, and partly because such a study was not needed for present purposes. At no time during the study of the department of public works was the competency of the central shops to do the repair work questioned or any serious complaint made of the general quality of the work done. Sometimes charges are reported to be high, and often there is disagreement about what repair work should be done.

d. <u>Servicing Department Equipment</u>: The arrangements for servicing are not systematic or uniform and are not provided to meet the special needs of public works operations. Most of the equipment is used during the day shift and normally the necessary regular work of cleaning the equipment, of inflating tires, of checking the oil, water, battery, brakes, lights, and other items, of fueling the equipment, and of greasing, should be done outside of regular work hours. Actually many hours of equipment time, chauffeur time, and crew time are lost to the city because certain servicing work has to be done during regular shifts. The practice of crews quitting one to two hours early to wash and polish their equipment is discussed in several chapters of this report, and it is shown that the city is thereby paying unreasonably high prices for this service. In the same way, any work of fueling, changing oil, or checking the equipment done during regular hours is also tremendously expensive. If only five percent of the time of the chauffeurs and truck crews can be spent in useful work rather than in servicing equipment, practically five percent of the equipment and equipment crews could be eliminated. The consequent saving would exceed considerably the cost of a regular department crew for servicing equipment outside regular hours.

Most of the trucks are greased in the central shops on Saturday mornings, when they are not normally used on department work. In general, greasing and oil change are the only servicing operations that are done by the central shops, mainly because the using agencies believe that the shop costs for other service would be too high. Actually the repair budgets do not adequately provide for the use of the central shops for this work.

There is ordinarily no central control by the using agencies of servicing work. Each driver is responsible for seeing that his automobile, truck, or machine is greased, the tires properly inflated, the radiator and battery filled, the oil checked and changed as necessary, to keep the unit in good condition. Some drivers are very conscientious, and regularly do the necessary servicing and make the usual checks, but, as might be expected, others are careless, and there is no systematic record to show which vehicles are not given adequate attention.

Preventive maintenance inspections, which should provide the basis for corrective repairs before damage becomes serious, are not made. As a general practice, vehicles and machines are not given shop attention until they break down or become noisy. Breakdowns are especially costly because of the expense that is usually involved, not only in towing and making major replacements and repairs, but also in idling entire crews for considerable periods, sometimes for several hours, before a substitute vehicle can be brought out, or before the employes can be assigned to other work when no replacement is available.

The situation with respect to city owned automobiles is no better than that for trucks and machines. The practice is to assign each automobile to an individual employe who is supposed to see that the vehicle is properly garaged each night (usually at his home) and to have the equipment regularly serviced and kept in good condition. Many employes take good care of the automobiles assigned to them, but instances of serious neglect and complete lack of servicing, until actual breakdowns occurred, are reported.

e. Storage of Equipment: Most of the department equipment, with the exception of passenger vehicles, is stored in the new department yards at 2323 Army Street. The buildings for housing the equipment are excellent for the purpose. The yard is well protected with fences and by watchman service outside of normal working hours. No charges for storage are made in the equipment records.

f. Retirement of Equipment: There is no established policy for the orderly retirement of equipment. It is the current practice to keep vehicles in service as long as they can be repaired, regardless of the cost, and, in fact, almost all machines and vehicles are kept in service long after their economically useful life has ended. Adequate information is not available to estimate the extra cost to the city of using out-of-date, obsolete, and worn-out equipment.

A definite policy regulating the retirement and replacement of equipment should be adopted, and standard life spans for the various kinds and sizes of equipment should be fixed after adequate cost data for equipment are secured.

g. Equipment Records: Rather detailed records of public works equipment use and costs are kept by the bureau of accounts, but, unfortunately, the costs represent only the expense reported by the purchasing department and do not include that incurred by the department of public works personnel. The records do not include any provision for depreciation or for storage. Nevertheless, the records have considerable value and show for each vehicle or machine the amount of use in miles, the amount of fuel, oil, and grease used, the cost of repairs, and the expense for tires. The data are recorded by months and totaled by years, but no reports of such use or cost are furnished to the using agencies or to department officials. The total costs for the fiscal year 1950-51 were not available in December, 1951.

At present, a substantial amount of departmental expense on equipment is not reported to the bureau of accounts, and consequently is omitted from the records. The time of chauffeurs and crew members spent on washing, polishing, adjusting, repairing, and servicing the equipment, is charged to operating accounts or work orders and not to equipment, thereby making both records inaccurate. There is no way to determine how much time of public worksemployes should have been charged to equipment expense, but it is estimated to exceed five percent of the total time of chauffeurs and employes assigned to vehicles or machines.

Accurate records of equipment use and expense form the basis of any modern equipment management plan. Detailed cost records are used by large fleet owners in deciding many kinds of equipment problems concerning use, retirement, and replacement, and in establishing policies of use and maintenance. It is axiomatic in the transportation business that a fleet owner without adequate records does not stay in business very long. It is just as important that a municipal agency should manage its equipment scientifically and soundly as that a private transportation company should do so. Adequate records of equipment costs should be established no matter which plan of management is adopted for department equipment.

h. Rented Equipment: As of August 15, 1951, the department was renting 34 vehicles, of which number, 8 were passenger cars, 20 were dump trucks, and 6 were pickups and panel trucks. The rental rates for trucks are fixed by the State Public Utilities Commission. Rental rates for passenger cars are determined by bid. The basis of the rental rates vary with the type of vehicle. Dump trucks are rented on an hourly basis, flat trucks on a monthly basis, and passenger cars, pickup, and panel, trucks, on a flat monthly rate and mileage basis.

An analysis of samples of the cost information available indicates that some equipment is being rented at a cost approximately equal to the cost of city maintenance, operation, and depreciation of the same type of equipment. However, certain other types of equipment, particularly pickup and panel trucks, are rented at a cost considerably in excess of the cost at which the city is able to maintain and operate such equipment. It is essential that a thorough analysis be made of the cost of renting equipment

in comparison with the cost of buying and operating the equipment by the city. An analysis should also be made of such other factors as frequency and amount of use, which would influence the decision whether to rent or buy equipment. In any event, the city should be in a position to show that equipment is acquired only after a complete cost and operational analysis has been made. It is, therefore, recommended that no piece of equipment be rented unless it can be demonstrated that the rental would be cheaper and more practical than the purchase of such equipment.

i. Private Automobile Use on City Business: Certain employes in the bureaus of engineering and architecture are authorized by the director of public works to use their private automobiles on city business when city-owned or leased equipment cannot be made available. The authorizations are made in departmental formal meetings and are noted in the minutes. The employe receives seven cents a mile for use on city business. A report in duplicate is prepared each day by the employe concerned, showing the trips made and the mileage of each, and certifying to the use and mileage. The control is good and the plan seems to be working well.

It is reported that a former plan, of paying monthly allowances for private car use, was seriously abused and was abandoned in favor of the present plan, which provides better control.

j. Facilities for Care of City-Owned Automobiles: There are at present no municipal facilities for the central storage of city-owned passenger vehicles or for the servicing of such vehicles. As was noted in a preceding section, each city-owned automobile is stored, outside of regular working hours, at the home of an employe of the department. The city arranges that the automobiles shall be washed and greased and have the oil changed at a private service station about ten blocks from the city hall. It is the duty of the employe, who is given out-of-hours custody of the equipment, to have it serviced at regular intervals. Gasoline must be secured from the purchasing department station near the central shop. The arrangements are not very satisfactory. Considerable inconvenience to the employes is caused by unfavorably located service stations, and many additional miles must be traveled to reach the stations. Furthermore, considerable time is lost by employes when equipment has to be left for several hours (as is normally the case) for greasing and washing.

It has been mentioned in other chapters that those using automobiles on city business find it very difficult to find parking space near the city hall. No provision is made for parking, either in a garage or in a reserved section on the adjacent streets.

City authorities should consider the advisability of providing or leasing a garage near the city hall for servicing automobiles, for providing temporary day parking space, and for providing night parking facilities for certain department equipment.

4. Proposed Plan for Equipment Management

a. General Description of the Plan: A study of the present plan of equipment administration shows clearly that city authorities should adopt measures to eliminate the present confusion as to the responsibility for equipment maintenance, to provide a positive control for the maintenance of equipment, to develop a sound system of equipment records, and to institute a new management based on ascertained facts of use and cost.

Two basically sound plans of equipment management are feasible. One is to make a central city agency such as the purchasing department, responsible for managing, maintaining, servicing, and replacing all municipal equipment and for furnishing, at definite rental rates, the equipment required by each agency of the city. The other plan is to provide central management for the equipment of the public works department within that department, to use the facilities of the central shops for repair work under the definite control of department equipment inspectors, and to establish a sound record system and a simple plan of charging equipment expense to operating accounts and work orders. The latter plan is believed to be the better of the two, at least at the present time, and it will be further described in the sections that follow.

Briefly, the proposed plan involves the establishment, within the department of public works, of an equipment management agency to supervise the preventive maintenance inspections, to order and follow up the repair work, and to provide for the equipment needs of the department. The agency should assign suitable equipment to using agencies, at rental rates that will pay for the total cost to the city including depreciation, and should operate and maintain the equipment, retire and replace the equipment according to definite policies and standards, and secure new equipment as necessary.

b. Proposed Organization for Equipment Management: Since the functions of the new agency proposed for equipment management will be largely administrative in character, it is suggested that a bureau of equipment management be established in the administrative branch of the department, and that the bureau be headed by an equipment manager who should report directly to the director of administration (assistant director of public works administration). The position of equipment manager should be filled by a qualified motor transportation supervisor who is experienced in the administration of a large fleet of motor vehicles. He should be made responsible for supervising a modern preventive maintenance system, for coordinating the necessary repair work with the officials of the central shops, for establishing a sound equipment record system, for establishing equipment rental rates that will represent the full cost, for making vehicles available to using agencies as needed, for operating a pool for equipment not required permanently by a unit of the department, for requisitioning and retiring equipment of the department.

The staff of the new bureau should include, in addition to the equipment manager, an equipment inspector, three garagemen, a head equipment clerk, and a general clerk. The proposed organization would be as follows:

Name of Unit	Positions
Bureau of equipment management	Equipment manager
Equipment inspection section	Equipment inspector
	Garagemen (3)
Equipment records section	Head equipment clerk
	General clerk

The equipment inspector should be a thoroughly qualified mechanic, experienced in truck, automobile, and machinery maintenance and repairs, in making preventive maintenance inspections, and in dealing with a repair shop in getting the required work done. One of the garagemen would work with the equipment inspector as a helper.

The other two garagemen would do the necessary servicing on department equipment. The equipment records section would be responsible for keeping equipment cost and use records, for auditing equipment use reports, and for maintaining preventive maintenance records. It is recommended that this organization plan be put into effect.

c. Preventive Maintenance System: The preventive maintenance system proposed for adoption is the core of the equipment maintenance program and is the chief factor in providing economical equipment maintenance. The purpose of the system is to secure that examinations of each item of equipment shall be made on a systematic basis by a qualified equipment inspector for the purpose of identifying needed repairs, of diagnosing weaknesses before they are apparent to an operator, and of determining the exact kind and extent of work to be done by the repair shop. The inspector should maintain close liaison with the central shops to advise on the kind of repairs or to authorize additional work. He would be generally responsible for seeing that equipment is maintained in good condition, for scheduling inspections, and for supervising the servicing work, which is a definite part of the preventive maintenance plan. The service crew would do its work outside regular working hours and would make a general inspection each day for satisfactory condition of brakes, lights, horn, windshield wiper, and general cleanness, would inflate the tires, fill the gas tank and radiator, and check the oil. Part of the equipment would be greased or washed on each shift according to an established schedule.

It is recommended that a preventive maintenance system be adopted, that a systematic inspection schedule be developed, that the equipment be regularly inspected and repaired, and that a servicing crew be provided to make all vehicles ready for use at the start of the working day.

d. Equipment Rental Plan: An equipment rental plan is a usual provision made by many cities and private agencies to charge operating accounts, projects, and work orders, for actual equipment expense, simply and accurately. Under this plan, the bureau of equipment management would pay the cost of gasoline, oil, supplies, tires, repairs, servicing, and storage and would keep careful records of all items of expense. The bureau would establish an hourly rental rate for each class of equipment, and the using agencies would be charged this rate for each hour the equipment is used by them. If a piece of equipment breaks down, the rental payment stops, so it is of great importance to the bureau of equipment management to keep the equipment in good condition.

A revolving account, to which the rentals would be credited and from which expenses for operation and maintenance would be paid, should be established for the bureau of equipment management.

It is desirable, though not essential, that the element of depreciation be included in the rental rates. If this is done, the depreciation part of the earnings would be credited to a depreciation account from which equipment replacements would be made. The equipment service and the depreciation account would be subject to regular budget control. Under such a plan, the equipment could be replaced when its economically useful life is ended, making it possible for the equipment system to operate at maximum efficiency and economy.

It is recommended that an equipment rental plan be developed and installed in the department.

e. Reserve Equipment: The present practice of having almost no reserve equipment causes tremendous waste of time and effort in equipment using agencies. The need for sufficient reserve equipment to replace items that are being inspected and repaired is well understood and accepted by all large equipment users. It is even desirable to make some allowance for peak use and to have a few vehicles ready to be put into service in cases of breakdown or accident.

It is recommended that the whole policy of providing reserve equipment be examined carefully, and that a new policy be developed as the basis for providing an adequate equipment reserve.

f. Assignment of Equipment: Much of the equipment of the department is used in the conduct of regular services and is required full time for the work. If an item of equipment is needed eight hours a day every regular working day, it should be assigned permanently to the particular bureau or division involved. In case of breakdowns or accidents, or for preventive maintenance inspection or repair work, such equipment would be exchanged for similar equipment held in reserve.

Equipment not needed full time by a using agency may be assigned part time regularly, say mornings or afternoons, with the idea that it would be available for reassignment from the pool at other times. The part time using agency would pay only for the hours of regular assignment.

Permanent assignment and regular part time assignment would be approved by the director of administration on the basis of clear justification for such assignment. The assignment of other equipment and reserve equipment would be made by the equipment manager. Any equipment,for which regular assignment cannot be justified, should be pooled for the common use of department agencies.

g. Equipment Pool: An equipment pool is proposed for the management of all equipment that is not regularly assigned. The establishment of an equipment pool under present conditions is out of the question. Not only is there no reserve equipment, there is an actual shortage of equipment. Before pool administration can be successful there must be a reserve equivalent to at least five percent of the total equipment, and an even larger reserve strength is desirable.

An equipment pool is often restricted to passenger automobiles, but it should be established in the department for trucks and even for such maintenance equipment as compressors, air tools, and other machines that may be needed by several agencies.

It is recommended,that,when a reasonable amount of reserve equipment is available, an equipment pool be established for the intermittent assignment of trucks, automobiles, and certain other equipment.

h. Leasing Equipment: Any equipment that is leased by the department should be utilized in the same way as other department equipment and should be managed by the bureau of equipment management. In every instance the bureau should make a careful analysis of the comparative cost to the city of owning its own equipment or of leasing certain items for department use. If lease arrangements which are advantageous to the city can be made, then equipment should be provided under this plan, but in any case when rented or leased equipment costs more than city-owned equipment, the city should purchase the necessary items.